



DEPARTMENT OF THE INTERIOR

FINAL

ENVIRONMENTAL IMPACT STATEMENT

**PROPOSED 1981 OUTER CONTINENTAL SHELF OIL AND GAS
LEASE SALE OFFSHORE CENTRAL AND NORTHERN CALIFORNIA**

OCS SALE NO. 53

VOLUME 1 OF 2

*Environmental
Protection Agency
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Prepared by

Bureau of Land Management
Dept. of the Interior

SEPTEMBER 1980

Frank Dugg

Director

Bureau of Land Management

SUMMARY

1. Preliminary Information

Proposed OCS Oil and Gas Lease Sale No. 53

Draft () Final (X) Environmental Impact Statement

Type of Action:

Administrative (X) Legislative ()

Lead Agency:

United States Department of the Interior
Bureau of Land Management
Pacific Outer Continental Shelf Office
1340 W. Sixth St., Room 200
Los Angeles, CA 90017

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Area of Project Impact:

Offshore and onshore areas, central and northern California

2. Description of Area and Proposed Action

This Environmental Impact Statement (EIS) was prepared by the Bureau of Land Management's Pacific Outer Continental Shelf Office. It implements the Council on Environmental Quality's (CEQ) new regulations regarding format and scope of an EIS. The new regulations involve a number of changes which were designed to make an EIS more useful to decisionmakers and the public.

Proposed OCS Sale No. 53 includes a maximum offering of 242 tracts for oil and gas leasing offshore central and northern California. Tracts comprise 532,258 hectares (1,315,205 acres) on the Federal OCS, ranging seaward from 3 to as far as 27 miles, and lying in water depths from 50 to 750 meters (162 to 2,437 feet). Tracts comprise five distinct subareas, extending from waters opposite Humboldt Bay in northern California to offshore waters opposite Point Conception in central California. There are no Federal oil and gas leases in the area at present. Very minor exploratory drilling has occurred in some areas previously. Because it is a frontier area, the exact extent of oil and gas resources which might be present is somewhat uncertain. The U.S.

Geological Survey estimates the most probable resource amounts at 548 million barrels of oil and 621 billion cubic feet of gas. Four of the subareas are regarded as oil prone, while all five are regarded as also likely containing gas. Pending final decision by the Secretary of the Interior, the proposed lease Sale is tentatively scheduled for May 1981.

3. Issues and Areas of Concern

Coordination with Legal Agencies

As authorized by the OCS Lands Act, as amended, the Bureau of Land Management (BLM) and the U.S. Geological Survey (USGS) serve as the primary Federal agencies administering these sales. They are in constant coordination with each other throughout the presale processes and the production phases, as well as coordinating as appropriate with other Federal, State, local, and non-governmental agencies and organizations.

Determination of Public Issues and Areas of Concern

One important aspect of the Council on Environmental Qualities (CEQ) new regulations is the requirement for "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action." The scoping process for proposed Sale No. 53 began in January 1979. At that time, State and local governmental units, non-government agencies and organizations, and the general public were invited to a series of meetings in central and northern California cities. These meetings helped establish the particular issues and alternatives which would be analyzed in the EIS.

Major Environmental Issues and Areas of Concern

The scoping process and coordination with other Federal agencies identified the following environmental issues and areas as meriting special attention and emphasis in the environmental assessment process:

- | | |
|-----------------------------------|--|
| (1) Air Quality | (8) Socio-Economics |
| (2) Water Quality | (9) Land Use |
| (3) Marine and Coastal Ecosystems | (10) Transportation Systems |
| (4) Endangered Species | (11) Military Use |
| (5) Proposed Marine Sanctuaries | (12) Archaeological and Cultural Resources |
| (6) Commercial Fishing | (13) Visual Resources |
| (7) Recreation and Sportfishing | |

4. Major Alternatives and Environmental Impacts

Fifteen alternatives are presented. The total sale offering is one alternative. Five total basin deletion alternatives are also discussed as well as six alternatives designed to reduce conflicts with sea otters, commercial fisheries, sensitive biological areas, marine

sanctuaries and geological hazards. A discussion of why the air quality alternative, presented in the DEIS, was no longer necessary is also included. The remaining three alternatives are: No Sale, Delay the Sale and Other. This last section illustrates how the Secretary could recombine the alternatives presented to create new ones.

Alternative 1 - Hold the Sale as Proposed

Holding the Sale as proposed would result in opening an OCS frontier area which has had no significant exploratory oil and gas activity in the past. It would result in certain environmental impacts. Briefly, these impacts include the following:

a. Air Quality: Oil and gas exploration and development activities will result in increased emissions of various types of air pollutants, particularly hydrocarbons and nitrogen dioxide. Lessor quantities of SO₂, CO, particulates and hydrogen sulfide are also emitted. In the Air Quality Study the model results show that, in general, Sale 53-related development will not significantly degrade onshore air quality. The increment of air quality deterioration considered significant by DOI could be marginally exceeded by Sale 53 development in several areas. These impacts would be mitigated by the cumulative impact provision of the existing DOI air quality regulations.

b. Water Quality: Water quality will be decreased by: resuspension of sediment through exploration and development activities and pipeline construction, discharge of sewage, formation water, drilling muds, and cuttings and hydrocarbon discharge through potential accidents and small chronic discharges.

Pipeline laying and drilling mud operations will have short-term impacts on water quality by causing increased turbidity from suspended bottom sediments. Discharges from OCS activities will have some effect on trace metal concentrations in lower trophic level invertebrates but should have insignificant effects on the entire marine food web. Sewage from platforms will have an insignificant impact given the dilution by ocean water, with the exception of water degradation in the immediate vicinity of the discharge. Drilling mud and cuttings will have a local impact on water quality which is attenuated with increasing distance from the point of discharge. Impacts from formation water discharge are expected to be minor. Greatest potential impacts would come from an oil spill; 2.29 spills over 1,000 bbl are projected to occur.

c. Marine Mammals and Ecosystems: Ecological losses could result from oil spills if important biological resources were significantly impacted. Other potential impacting agents (see water quality) could impact marine life. Significant long term impacts are not expected.

d. Endangered Species: Endangered species consultation

with USFWS and NMFS has indicated significant problems might occur with only three of the species in this area, the sea otter and the right and gray whales.

e. Proposed Marine Sanctuaries: The establishment of the proposed sanctuaries will not be prevented by the sale. Portions of two tracts 069 and 073 are within the proposed Pt. Reyes-Farallon Islands Marine Sanctuary. The sale is not expected to alter the character of this or other proposed marine sanctuary areas.

f. Commercial Fisheries: Commercial fishing could be impacted to a generally minor degree. The fisheries of greatest concern include: salmon, dover and petrale sole. Impact agents include those factors listed under water quality and space use conflicts.

g. Recreation and Sportfishing: These resources could be most significantly impacted by an oil spill hitting the shoreline, affecting the economy and aesthetics in an area. Tourism over the total Sale area will be relatively unaffected by a spill. However, localized impacts could be quite significant.

h. Socio-Economics: Socio-economic impacts would result in the level and/or composition of population and jobs in the region. Generally, socio-economic impacts are relatively minor in the central and northern California coastal areas as a result of the proposed Sale.

i. Land Use: Primary impacts on land use from the proposal will result from the demand for land for onshore facilities. There may be secondary land use impacts caused by the physical demands for land for the additional population. These secondary impacts could be significant at the local level in rural areas. The siting of OCS related facilities would also place a strain on the available water supplies in many areas.

j. Transportation Systems: The proposed lease sale could generate some increased direct employment in the shipping industry and other secondary employment. Increase in employment is relatively small when compared to total employment in the regional economy. However, for certain sectors, changes could be more significant. The estimated number of vessel accidents during the proposed sale development and production would be small.

k. Military Use: There are no anticipated impacts on military operations in any of the proposed sale areas, with the possible exception of Submarine Diving Area U5. This diving area covers tracts 096, 100, 104, 105, 108, 109, 114, 115, 116 and 119. Note, however, that the Department of Defense has agreed to joint operations in this area.

1. Archaeological and Cultural Resources: Some shallower waters of the OCS could have important potential for prehistoric and historic cultural resources. Physical disruption could occur if construction activities took place on undetected or ignored cultural resource sites.

m. Visual Resources: The visual impact of offshore facilities will have a relatively minor impact on the aesthetics of the area because of the size of the structures relative to their distance from shore. Onshore facilities can be sited in such a manner as to lessen the visual impact and thus are expected to have a minor impact on the aesthetics of the area.

Alternative 2 - Modify the Sale by Deleting the Eel River Basin

The Eel River area consists of 30 tracts, numbers 001 through 030, totaling 66,301 hectares (163,765 acres). This represents 12.46 percent of the total proposed sale area. Estimated recoverable gas resources are 182 billion cubic feet (conditional mean estimate). The risked mean resource estimate is 71 billion cubic feet of gas, which is 11.4 percent of the total estimated gas resources within the proposed sale area. Presently, there are no estimates of recoverable oil resources. There are no previously leased tracts in this area.

The major areas of concern for the Eel River Basin are: 1) commercial fishing, 2) marine life (in general), 3) air quality, 4) geologic hazards, and 5) aesthetics. Deletion of this basin from the sale would eliminate these potential impacts.

Alternative 3 - Modify the Sale by Deleting the Point Arena Basin

The Point Arena area consists of 30 tracts, numbers 31 through 60 totaling 68,872 hectares (170,113 acres). This represents 12.94 percent of the total proposed sale area. Estimated recoverable oil and gas resources are 131 million barrels of oil and 134.2 billion cubic feet of gas (conditional mean estimates). Risked mean resource estimates are 25 million barrels of oil and 25 billion cubic feet of gas, which are 4.6 and 4.0 percent, respectively, of the total estimated resources within the proposed sale area. There are no previously leased tracts in this area.

Deletion of the entire basin would, of course, eliminate all potential OCS related conflicts with all other resources. The major areas of concern for the Point Arena Basin are: 1) social/life style, 2) commercial fishing, 3) marine life (in general), 4) air quality, 5) geologic hazards, 6) recreation, 7) aesthetics and transportation. It should be noted that deletion of all the Point Arena Basin would eliminate particular concerns over the following: loss of or interference with rural, historical and recreational qualities, loss of subsistence gathering lifestyle, population shifts that could place

excessive stress of police and fire service, aggravation of existing highway 1 and 128 traffic problems and crowded port facilities at Fort Bragg. Also, there would be a loss of \$35,000,000 in expected income from lease related activities.

Alternative 4 - Modify the Sale by Deleting the Bodega Basin

The area in the vicinity of Bodega Bay consists of eight tracts, numbers 061 through 068, totalling 18,432 hectares (45,545 acres). This represents 3.46 percent of the total proposed sale area.

Estimated recoverable oil and gas resources are 23.2 million barrels of oil and 22.1 billion cubic feet of gas (conditional mean estimates). Risked mean resource estimates are 8 million barrels of oil and 8 billion cubic feet of gas, which are 1.5 and 1.3 percent respectively, of the total estimated resources within the proposed sale area. There are no previously leased tracts in this area.

Deletion of the entire basin would, of course, eliminate all potential OCS related conflicts with all other resources. The major areas of concern for the Bodega Basin are: 1) the proposed Pt. Reyes-Farallon Island marine sanctuary, 2) mariculture operations, 3) marine life, 4) geologic hazards and 5) recreation. Because of the small number of tracts in this basin, potential conflicts with the above resources are nearly ubiquitous throughout the basin.

Specific potential resource conflicts that could be avoided by deletion of the tracts are: 1) estuarine and wildlife habitat in Bodega Bay, Tomales Bay, Drakes Estero, Marin Estero, 2) major shorebird, waterfowl area (Tomales Bay), 3) oyster farming at Tomales Bay and Drakes Estero, 4) proximity to Point Reyes National Seashore and Golden Gate National Recreation Area.

Alternative 5 - Modify the Sale by Deleting the Santa Cruz Basin

The Santa Cruz Area consists of 59 tracts, numbers 069 through 128, totaling 133,296 hectares (329,241 acres). This represents 25.04 percent of the total proposed sale area. Estimated recoverable oil and gas resources are 123 million barrels of oil and 123 billion cubic feet of gas (conditional mean estimates). Risked mean resource estimates are 113 million barrels of oil and 113 billion cubic feet of gas which are 20.6 and 18.2 percent, respectively, of the total estimated resources within the proposed sale area.

Deletion of the entire basin would, of course, eliminate all potential OCS related conflicts with all other resources. The major areas of concern for the Santa Cruz Basin are: 1) marine life, 2) proposed Pt. Reyes-Farallon Islands marine sanctuary, 3) air quality, 4) geologic hazards, 5) recreation and 6) aesthetics. Deletion of the basin from

the sale would eliminate these potential impacts. It should be noted that recreational use of the coast, opposite this basin, is very heavy. The quality of the recreational experience is in part dependent upon the aesthetics of the area. Deleting this basin would have the most significant beneficial effect upon recreational and aesthetic resources. The reduction in potential impacts to sea otters could be the other most significant benefit of deleting Santa Cruz Basin.

Alternative 6 - Modify the Sale by Deleting Santa Maria Basin

The Santa Maria area consists of 115 tracts, numbers 129 through 243, totaling 245,357 hectares (606,031 acres). This represents 46.10 percent of the total proposed sale area. Estimated recoverable oil and gas resources are 404 million barrels of oil and 409 billion cubic feet of gas (conditional mean estimates). Risked mean resource estimates are 402 million barrels of oil and 404 billion cubic feet of gas which are 73.3 and 65.1 percent, respectively, of the total estimated resources within the proposed sale area. There are no previously leased tracts in this area.

Deletion of the entire basin would, of course, eliminate all potential OCS related conflicts with all other resources. The major areas of concern for the Santa Maria Basin are: 1) commercial fishing, 2) marine life, 3) proposed Santa Barbara Channel marine sanctuary, 4) Channel Islands National Park, 5) air quality, 6) geologic hazards, and 7) aesthetics. Many of the tracts with potential aesthetic conflicts are only partial tracts. One of the most significant resource conflicts that could be eliminated by this deletion would be the conflict with the sea otter.

Alternative 7 - Modify the Sale to Improve Air Quality

The DEIS contained an alternative to modify the sale by establishing a six mile buffer zone in the Santa Maria and Santa Cruz basins to improve air quality. That alternative has been deleted from further consideration because controls mandated by new DOI regulations have reduced the need for further mitigation.

Since the time the DEIS was prepared USGS has promulgated regulations to control air pollutant emissions that significantly affect onshore air quality. These regulations contained provisions that mandate more stringent emission controls on those sources close to shore than those located further offshore. In effect, the regulations already take into account the additional dilution that the three mile greater distance to shore would have provided. For this reason deletion of tracts between 3 and 6 miles would not substantially reduce air quality impacts.

Alternative 8 - Modify the Sale by Creating a 6-mile Buffer Zone

Within the Santa Maria Basin to Enhance Sea Otter Protection

a. Description: Santa Maria tracts 130, 131, 134, 137, 138, 141, 142, 143, 144-147, 149, 150, 151, 154, and 155, or portions of these tracts, are located within six miles of the sea otter range 7). This alternative provides an option to ensure no OCS exploration and development occurs within six miles of the sea otter range through the establishment of a 6-mile buffer zone in the northern Santa Maria tracts. The buffer zone could be established through the deletion of tracts (138, 142, 143, 146, 147, and 151) and establishment of a stipulation which would require that no development activities take place within six miles of the coast for tracts 130, 131, 134, 137, 141, 144, 145, 149, 150, 154, and 155. The tracts or portion of tracts that may be deleted under this alternative represent 1.2 percent of the total proposed sale area (6,264 hectares).

If an oil spill occurred, the sea otters living off the central coast could be impacted. The sea otter's ability to maintain its body heat could be reduced if the animal's insulation ability was reduced by oil adhering to its fur. If 20 percent of the sea otter's body is covered with oil the animal will die. The general habitat for this animal is in shallow water relatively close to shore.

The average number of spills, from the proposed sale, expected to strike the sea otter area is low. This alternative would not result in a significant reduction in the number of spills expected to hit this area. However, the probability of one or more spills hitting this area as a result of the proposed sale is reduced. Therefore, this alternative would mitigate potential Sale No. 53 impacts for sea otters, as well as Gray whales, intertidal organisms, recreational resources and air quality. Note, the sea otter was placed on the Federal Threatened Species List because of the oil spill threat from existing tanker operations. This threat will still exist without this Alternative or this proposed sale. The reduction in the estimated recoverable resources are considered low.

Alternative 9 - Modify the Sale by Deleting Part of the Eel River Basin to Enhance Protection of Commercial Fisheries

This alternative would eliminate tracts 1, 5, 9, 14 and 19 which overlap the Dover sole (Microstomus pacificus) spawning grounds and tracts 2, 3, 6, 7, 10, 11, 15, 16, 20 and 24 which overlap the Petrale sole (Eopsetta jordani) spawning grounds. These two groups of tracts comprise 52 percent by area of the Eel River Basin tracts, six (6) percent of the total proposed sale area.

The Eel River Basin is one of the world's most productive fishing grounds. In 1975, the most recent year for which there is comprehensive data, 3,900,000 pounds of flatfish worth \$586,000 were caught in this basin. This represents over 10 percent of all flatfish caught in California. As noted above, Petrale and Dover sole both have important spawning grounds in this basin. Discharge of drilling muds and cuttings could deleteriously affect the spawning grounds, spawning behavior, and

the survival of eggs, larvae, and juveniles. Manmade structures could cause physical disruption of the spawning grounds. Disruption of these spawning areas probably would seriously impact the populations and their fisheries. This alternative would eliminate impacts from drilling muds, drill cuttings and manmade structures by eliminating tracts that overlap these spawning areas. Similar spawning areas are not known to occur in any of the other proposed lease tract basins.

Adoption of this alternative could also reduce impacts from the proposed sale to air quality, harbor seals, birds, terrestrial plants and animals, the endangered gray whale, other biological communities, other commercial and sport fisheries, the population, employment, the economy, a proposed traffic lane, cultural resources and geohazards.

Alternative 10 - Modify the Sale by Deleting Tracts to
Enhance Protection of Sensitive Biological Areas

This alternative lists possible deletion options not already listed under the sea otter and commercial fishing alternatives (numbers 8 and 9). Eel River tracts 3, 4, 7, 8, 11 and 12 are located over an area of extensive hard rock outcrops and reefs. These provide extremely important habitat to a diverse range of benthic organisms, including many species of fish.

Point Arena tracts 48, 52, 55, 57 and 60 have potential conflicts for a number of reasons. These tracts are close to very productive abalone grounds. The abalone is an important member of the marine community in this area, as well as the basis of a major recreational fishery. Rich intertidal areas front on these tracts and the deletion would provide an additional buffer zone. Also, two sea bird rookeries, Devil's Basin Rock and White Rock, are adjacent to this area.

Leasing of Santa Cruz tracts 76, 80, 84 and 88 could create potential conflicts because of their proximity to the extremely rich Bean Hollow intertidal area and the James V. Fitzgerald Marine Reserve.

Alternative 11 - Modify The Sale by Deleting Tracts Adjacent To
Proposed Marine Sanctuary Areas

The proposed sale includes parts of two tracts within the Point Reyes/Farallon Island Marine Sanctuary and parts of seven tracts which are part of the Monterey Bay and Adjacent Waters Sanctuary Proposals.

The deletion of tracts 069 and 073, which lie partially within the proposed Point Reyes/Farallon Islands Marine Sanctuary would serve to comply with NOAA's requirement that oil and gas development activities be prohibited within the designated sanctuary boundary. An additional option in this case would be to delete only those portions of the tracts which lie within the proposed sanctuary. This option would remove approximately half of tract 069 and approximately fifteen percent of tract 073 from potential oil and gas development.

The study area for the proposed Monterey Bay and Adjacent Waters Marine Sanctuary proposal includes all or parts of tracts 107, 111, 112, 118, 122, 125 and 128. The deletion of these seven tracts by the Secretary would result in the creation of a buffer zone similar to that which would be created by deleting tracts within the Point Reyes/Farallon Islands sanctuary area.

Alternative 12 - Modify the Sale by Deleting Part of the
Eel River, Point Arena, Santa Cruz, and Santa
Maria Basins for Reasons of Geologic Hazards

This alternative deletes lease tracts selected by the United States Geological Survey for stipulation due to the presence of geologic hazards and/or constraints. Deletion recommendations by the State of California were also considered in developing this alternative, though some modification of the State's recommendations has occurred in light of new data acquisition.

The removal of these tracts represents a 27.3 percent decrease in the amount of acreage available for leasing from the four basins in question.

The proposed alternative would reduce the possibility of geologic phenomena impacting OCS exploration or development activities by deleting tracts which are characterized by the following geologic hazards or constraints: mass movement, submarine canyons or channels, and known active faults.

The deletion of those lease tracts identified within this alternative would reduce the possibility of an oil spill generated by pipeline rupture, platform collapse or well disruption as well as reduce the potential for loss of life and/or equipment due to fault motion, seismic ground shaking, or seafloor instability associated with the geologic features identified above.

Alternative 13 - Other Alternatives

This alternative is included to emphasize the fact that the Secretary can choose any combination of alternatives or partial alternatives presented.

Alternative 14 - No Sale

Not holding the Sale would result in foregoing those environmental impacts noted under Alternative 1. It would also mean foregoing oil and gas resources resulting from the Sale, with concomitant implications for increased oil imports and lessened security relative to energy supply sources. This alternative would be at variance with current national policy encouraging increased domestic production of oil and gas.

Alternative 15 - Delay the Sale

A delay would hold up production activities. The period of delay would be the determining factor as to the extent of impacts. Delay would likely increase crude oil imports. It could also allow additional time for: 1) environmental studies, 2) possible technological improvements in OCS operations to increase resource recovery, and 3) an extension of lead time for local governmental bodies to plan for onshore impacts.

The foregoing discussion is intended as a summary only. The proposed action is discussed in detail in the EIS. The first chapter discusses the proposed action and the assumptions used in the analysis. The second chapter presents the alternatives and a summary of major impacts that would result from the proposal. The third chapter discusses the presently existing environment. The fourth chapter details all significant environmental impacts that would result from the proposed Sale. Chapter five lists references, six lists the preparers, seven presents consultation and coordination and chapter eight is an appendix. Reference papers provide additional detail. The reader is directed to these chapters for more information and the complete analysis.

ADDENDUM

The United States Geological Survey (USGS) recently informed the Bureau of Land Management that the Sale #53 estimated oil and gas reserves should be revised based upon more current data. The prior USGS estimates, which are listed in Table I.B.2.b-1, were assumed to be correct in the Sale #53 final EIS analysis of probable impacts. The Table I.B.2.b-1 figures were also used in the draft EIS. The following table shows the current (as of August 28, 1980) USGS resource estimates for each of the five Sale #53 basins:

Area	Oil (Million Barrels)	Gas (Billion Cubic Feet)	Oil (Million Barrels)	Gas (Billion Cubic Feet)
	<u>Conditional Mean</u>		<u>Risked Mean</u>	
Eel River	111	315	42	120
Point Arena	128	127	24	24
Bodega	28	28	9	9
Santa Cruz	130	130	119	119
Santa Maria	794	1,028	788	1,021

Although the new estimates differ from the previous ones for each of the five basins, the principal differences are in the Santa Maria and Eel River basins. In the Santa Maria basin, the expected recoverable resources (the risked means) and the expected recoverable resources if the basin contains at least one geologic structure which is hydrocarbon prone (the conditional means) are now roughly twice the amount assumed in the draft and final EIS analyses. The draft and final EIS also assume that the Eel River basin does not contain any oil. USGS now believes, however, that the expected recoverable amount of oil from the Eel River basin is 42 million barrels, and that the expected recoverable oil if the basin contains at least one geologic structure which is hydrocarbon prone is 111 million barrels.

It is possible that the USGS resource estimates will again be revised prior to the Secretary of the Interior's decision on Sale #53. The most recent available estimates will be used to prepare the Secretarial Issue Document (SID), which will be submitted to the Secretary of the Interior before a decision on Sale #53 is reached. Copies of the SID will be provided to members of the public upon request after the Secretary announces his decision.

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CHAPTER I

I. PURPOSE AND NEED FOR ACTION AND DESCRIPTION OF PROPOSAL

A. Purpose and Need for Action

The United States' energy problem is basically one of an increasing demand for energy while supplies of oil and natural gas are diminishing. Oil is one of the most versatile and widely used energy resources. To meet growing domestic needs, the U.S. has turned increasingly to oil imports. Currently, the U.S. produces about 54 percent of its total oil consumption. While reduction of oil imports has been an important element in national energy policy since the 1973 oil embargo, imports have actually increased since that time - both in absolute and relative terms. Although higher energy prices have reduced the growth rate of energy demand, an absolute decline in energy requirements is not foreseen by most analysts (even if prices continue to increase and other conservation measures are instituted) (Franssen, et al. 1978). The continued and significant dependence on foreign imports has economic and military and diplomatic implications. Dependence on foreign oil increases U.S. vulnerability to supply interruptions. It has resulted in an increased and significant balance of payments problem for this country. Dependence has resulted in serious economic and political dislocations in this country and throughout the world. Therefore, Congress, the President, and the Departments of Energy and the Interior have determined that oil and gas leasing policy can provide an important means by which dependence on foreign oil is reduced.

One component of that policy involves the strategy adopted by the Federal government with respect to leasing on the United States Outer Continental Shelf (OCS). These lands constitute the last major frontier for domestic petroleum and natural gas exploration. To a large extent, OCS areas around all U.S. coastlines consist of sedimentary rocks of the general types in which oil and gas are found. The U.S. Geological Survey suggests that 32 percent of all undiscovered oil resources within the United States may exist in the OCS to a water depth of 200 m (approximately 656 feet) and 22 percent of similarly defined natural gas resources may be located on the OCS (Miller, et al. 1975).

The unique character of the OCS with regard to potential energy supply does not stem solely from the magnitude of undiscovered resources which may be located there. The OCS is also unique institutionally since it is owned and controlled by the Federal government. Thus, it can be managed in a manner consistent with national energy policy objectives. The OCS is an area where the Federal government can have a positive impact on domestic production. By holding lease sales of OCS lands, the government can encourage domestic exploration, development, and production of oil and gas.

In order to ensure correlation of leasing policy with overall energy policy, a memorandum of understanding was signed in September 1978 between the Departments of the Interior (DOI) and Energy (DOE). The memorandum calls for DOE to set production goals, on a resource by resource basis, for all Federal leases. The Amendments to the OCS Lands Act, signed into law in September 1978, contain a provision requiring DOI to prepare a 5-year plan indicating the size, timing, and location of OCS leasing activity which will best meet national energy needs. In May 1979 DOE transmitted to DOI final OCS oil and gas production goals for those years included in the schedule. In June 1980 the Department of the Interior announced final approval of the 5-year planning schedule (June 1980 through June 1985) for oil and gas leasing on the OCS. Proposed OCS Lease Sale No. 53 offshore central and northern California is part of the schedule. The following section (I.B) details those administrative events that are involved in proposed OCS Sale No. 53 and describes the proposed Federal action in more detail.

B. Description of Proposal

1. Administrative Events Leading up to Proposal: Under the Outer Continental Shelf (OCS) Lands Act of August 7, 1953, (43 U.S.C. 1331-1343), as amended (92 Stat. 629), and the regulations issued thereunder (43 CFR 3300), the Department of the Interior is responsible for administering the mineral development of the Outer Continental Shelf. In the case of oil and gas development, the process involves several steps. These are as follows: 1) OCS Planning Schedule; 2) Request for Resource Reports; 3) Call for Nominations and Comments; 4) Tentative Tract Selection; 5) Scoping Meetings; 6) Draft Environmental Statement and subsequent Public Hearings; 7) Endangered Species Consultation; 8) Final Environmental Statement and Secretarial Issue Document; 9) Coordination with State(s); 10) Notice of Sale; 11) Sale; 12) Activity after a Sale; 13) Environmental monitoring.

The specifics of each step as they relate and will relate to proposed Lease Sale No. 53 are as follows:

a. OCS Planning Schedule: Section 208 of the Outer Continental Shelf Lands Act Amendments of 1978 (43 U.S.C. 1331 et. seq.) provides for new subsection 18 which requires that the Department of the Interior prepare "...an oil and gas leasing program...(which) shall consist of a schedule of proposed lease sales indicating...the size, timing, and location of leasing activity which...will best meet national energy needs for the five-year period..." In June 1979, a proposed leasing program, which built upon the existing schedule, was formally submitted to Congress. At that time, it was also submitted to Governors of affected coastal states, the U.S. Attorney General, and published in the Federal Register. A Final Environmental Impact Statement (FEIS) was prepared on the 5-year schedule and was available to the public in January 1980. A final 5-year planning schedule (June 1980 through June 1985) was announced in June 1980.

b. Request for Resource Reports: On September 30, 1977, the Bureau of Land Management issued a Call for Resource Reports for the Pacific OCS area extending from the California/Oregon border on the north to Point Conception on the south and seaward to approximately the 750 meter (2460 feet) isobath. Requests were submitted to 16 Federal and 12 State agencies. Information was sought regarding other valuable resources and uses of the area, possible impacts of mineral operations upon these resources, and use conflicts with potential oil and gas development. Recommendations concerning the resolution of any conflicts between the activities of these agencies and oil and gas leasing/-development in the OCS area were also requested.

c. Call for Nominations and Comments: On November 29, 1977, the Bureau of Land Management (BLM), pursuant to the authority prescribed in 43 CFR 3301.3 (1976), issued a Call for Nominations and

Comments (Federal Register, Vol. 42, No. 229). The Call asked that specific areas on the central and northern California OCS be identified relative to possible oil and gas leasing under the OCS Lands Act. The area under consideration for the proposed sale totaled 2,036 blocks and covered an estimated 4,347,302 hectares (10,742,183 acres). The petroleum industry was asked to designate specific tracts on which it would like to bid if a sale were held. The request also asked Federal, State, and local governments, other industries, universities, research institutions, environmental organizations, and the public to identify specific tracts they believe should be excluded from oil and gas leasing, or leased only under certain restrictions because of conflicting resource values or environmental factors.

In response to the Call for Nominations and Comments, on August 1, 1978 BLM announced that 27 oil companies nominated 1,743 blocks totaling 3,415,668 hectares (8,440,116 acres). In addition to the industry nominations, 47 comments were received from Federal, State, and local government units as well as environmental groups and private citizens expressing either concern about offshore leasing in general or recommending specific tracts be deleted.

d. Tentative Tract Selection: On October 10, 1978, the Department of the Interior announced selection of 243 tracts comprising 532,588 hectares for intensive environmental study for proposed OCS Sale No. 53 (see Visual No. 1). The tracts selected were the result of an environmental ranking of all areas in the Sale No. 53 call area. This environmental ranking utilized 24 different resource categories and resulted in a classification of areas into five different categories of environmental concern. No areas were included which were classified as involving the greatest environmental risk. The Bureau of Land Management's Division of Cadastral Survey later established for the Final EIS that the total Sale area involves 242 tracts comprising 532,258 hectares (1.315 million acres). See Table I.B.2.a-1. The tracts selected for comprehensive environmental analysis represented about 15.6 percent of the total area nominated by industry.

e. Scoping Meetings: In accordance with the Council on Environmental Quality's National Environmental Policy Act Regulations (Sec. 1501.7) which require that there be "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action", BLM-POCS conducted a series of six EIS scoping meetings in central and northern California. These meetings were held in January 1979 in the cities of Eureka, Fort Bragg, Santa Rosa, Redwood City, Santa Cruz, and San Luis Obispo. The meetings were open to all interested parties. Invitational letters were sent out to all coastal county planning departments, regional coastal commissions, numerous environmental groups, and private industry. At the time of invitation, news releases stating time, date, location, and nature of the meeting were mailed to 160 media outlets in the 11 coastal

counties. Notification was also given in the Federal Register. In addition, informal consultation was carried out with Federal, State, local and independent interest groups to further identify significant issues pertinent to the proposed action. A number of issues were raised during the scoping process, and those issues which provided the framework around which the Draft EIS was structured are discussed below.

As a result of the Public Hearings on the Sale No. 53 Draft EIS and oral and written comments, additional alternatives were developed for the Final EIS. Alternatives based on the five geographic basins have been included, and additional alternatives based on resource conflicts have been added. A total of thirteen alternatives have been developed for this Final EIS. Additionally, there is a concluding discussion (No. 14) that other possible alternatives are available to the Secretary of the Interior in designing and structuring the Sale No. 53 area. Section II.B. discusses each of these alternatives in detail.

Some comments addressed the timing of studies, commenting that completed studies lag behind the decision making process. BLM's Environmental Studies Program is designed to provide environmental information to help answer decisionmaker's questions throughout the entire OCS leasing and development process. However, in response to the concern that certain pertinent information needed from a particular study may fail to make it into the decision making process in a timely manner, a delay the sale option is included within the EIS (see Section II.B.13).

One such study which was identified throughout scoping meetings as a subject of great concern for the EIS is air quality impacts. An evaluation of the potential impacts on air quality from Lease Sale No. 53 was prepared. The results of this study are summarized in Sections IV.A.5 (emissions inventory) and IV.B.1 (onshore impacts and mitigating measures). The complete technical report is available in POCS Reference Paper No. 53-5. Final regulations are now in place which will mitigate potential onshore impacts and, therefore, the alternative relating to air quality impacts which was included in the Draft EIS is not included here (see Section II.B.6). Section IV.B.1.a provides a complete discussion of air quality impacts from proposed Sale No. 53.

Concern regarding potential impacts on marine mammals by OCS development was a recurrent issue raised by various groups during scoping consultations. Subject matter pertaining to this issue is thoroughly discussed in Sections III.A.2.c and IV.B.2.c within the EIS. As a result of the environmental analysis, BLM developed an alternative to modify Sale No. 53 by deleting part of the Santa Maria area to enhance sea otter protection. This is presented as an option to the proposed action (see Section II.B.7).

A significant number of comments at the Sale No. 53 scoping meetings were directed towards impacts on the commercial fishing industry by OCS

development. Fishermen expressed concern for loss of their equipment due to entanglement with obstructions related to OCS development. Major fisheries were identified within the northern and central California OCS and considered within the EIS (see Section III.B.I. and IV.B.4). OCS orders which protect the fishing industry are discussed in Section I.B.5 of the EIS, stipulations that mitigate known impacts are discussed in Section I.B.6, and the Fishermen's Contingency Fund which reimburses fishermen for losses is explained in Section I.B.7.c. Additionally, an alternative has been developed for the Final EIS which modifies the proposed Sale based on potential commercial fishing conflicts.

Another area of concern highlighted in scoping consultations was the effect that OCS development would have on recreational usage in the northern and central California coastal areas. This subject is treated in depth within Sections III.B.4.a and IV.B.4 of the EIS.

The question of pipelines and general hydrocarbon transportation issues were raised at scoping meetings. Transportation scenarios developed within the EIS were based on information supplied by the United States Geological Survey and existing, readily available information. The scenarios were sent to State and county organizations, industry representatives (WOGA) and others. In total, 13 groups reviewed the scenarios which were developed, and their comments were incorporated into the EIS. A detailed discussion of this topic can be found in EIS Reference Paper No. 53-1.

The major cultural resource concerns expressed during scoping consultations involved potential impacts on the Native American population, terrestrial and marine aboriginal sites, historic shipwrecks, and historic terrestrial structures. Types of impacts of primary concern included oil spill, visual intrusion, spiritual intrusion, site destruction and site masking. These subjects are considered in detail in Sections III.B.4.b and IV.B.7.

As a result of the scoping process, the public hearings, and oral and written comments on the Draft EIS, the design and analysis in this EIS focuses on major environmental impacts. Similarly, the alternatives to the proposed action included in this EIS resulted from the environmental scoping and review process which identified major areas of environmental concern. Alternatives were aligned around significant issues and impacts. Each alternative delineates major areas of concern and provides a means to alter the proposed action. See Section II.B. for a discussion of all alternatives that have been developed for the Final EIS.

f. Draft Environmental Impact Statement (DEIS) and Subsequent Public Hearings: Pursuant to section 102(2)(c) of the National Environment Policy Act of 1969 (42 U.S.C. 4321-4347), the

Department of the Interior's Bureau of Land Management announced on May 4, 1979 (Federal Register, Vol. 44, No. 88) that it intended to prepare an EIS for the purpose of considering the effects of proposed OCS Sale No. 53 offshore central and northern California. The DEIS considers all available data and information available up to this time and evaluates potential effects of the action on the marine environment, air quality, recreation, archaeology, geology, and socio-economics in the area. The DEIS is made available for public review and public hearings are then held. Public hearings on the Draft EIS were held in the following central and northern California cities on the dates indicated: Santa Rosa - June 16 and 17, 1980; Fort Bragg - June 18; Eureka - June 20; San Francisco - June 23 and 24; Santa Cruz - June 25; and San Luis Obispo - June 27. The DEIS was then updated to a Final Environmental Impact Statement.

g. Endangered Species Consultation: Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, the Bureau of Land Management and the U.S. Geological Survey must identify those species which may be affected by activities associated with the proposed lease sale and consult formally with the appropriate responsible Federal agency [either U.S. Fish and Wildlife Service (F&WS) or National Marine Fisheries Service (NMFS)] to determine if such species may be jeopardized by those activities. BLM and USGS have entered into joint consultation with NMFS and F&WS to determine if the exploration phases of the proposed sale will jeopardize species identified as possibly being affected. Final biological opinion regarding exploration phases will be received from NMFS and F&WS prior to the proposed lease sale. The reader is advised to review Section III.A.2.c, IV.B.2.c, and IV.B.2.e for identification of species which may be affected and assessment of the probable extent of effects from the proposed sale as determined by the Bureau of Land Management. These assessments have been made through independent analyses by BLM specialists. These analyses may not agree with those of the NMFS and/or F&WS and consultation therefore may continue as needed to resolve such differences. Also, consultation will be reinitiated as needed regarding development and production phases of OCS activities. Copies of NMFS's and F&WS's biological opinions will be available upon request from BLM following receipt of such opinion from the appropriate agencies.

h. Final Environmental Impact Statement (FEIS): The FEIS reflects Department of the Interior consideration of all comments received, including those from the public and Federal, State, and local officials. The Final Impact Statement is filed with the Environmental Protection Agency (EPA) and the Council on Environmental Quality (CEQ). None of the steps outlined above constitutes a decision to hold a sale. All are required as part of the process for compliance with NEPA, and are spelled out in regulations issued by CEQ and the Department of the Interior. Subsequent to publication of the FEIS, a 30-day waiting period must be allowed before the Secretary of the Interior may make a

decision on holding a sale. The decision is based upon the Secretarial Issue Document (SID) which summarizes the alternatives and important issues which have developed during the process. This decision is usually tentative only. Further coordination follows.

i. Coordination with State: Section 208, subsection 19, of the OCS Lands Act Amendments of 1978 provides for coordination and consultation with affected State and local governments. If the Secretary of the Interior makes a preliminary decision to hold a sale, the Governor of the affected State has 60 days in which to make recommendations. Thereafter, the Secretary of the Interior will respond to the "...Governor's recommendations, or...implement any alternative means identified in consultation with the Governor to provide for a reasonable balance between the national interest and the well-being of the citizens of the affected State."

j. Notice of Sale: If a final decision to hold the sale is then made by the Secretary of the Interior, he will specify what tracts shall be offered and what operating restrictions are to be imposed on lease purchasers. The Sale Notice will be published in the Federal Register. Under the pending OCS planning schedule, the Notice of Sale for proposed OCS Sale No. 53 would be issued in April 1981.

k. Sale: Outer Continental Shelf oil and gas lease sales are open to the public. Under the pending OCS planning schedule, the proposed OCS sale is scheduled for May 1981.

l. Activity After a Sale: Continued formal and informal contacts with the State for future planning and discussion of onshore facilities, such as pipeline corridors, are conducted, as well as coordination under Secretarial Order 2974. The U.S. Geological Survey assumes operational responsibility for the activity which follows.

m. Environmental Monitoring: BLM will consider environmental monitoring studies for the areas leased as a result of a sale. Each area would be evaluated on a case-by-case basis to design an effective monitoring program responsive to management questions. Special monitoring studies may be required for areas identified as having a special resource value. Appropriate State officials are contacted on a continuing basis in a consulting capacity. BLM will provide for a free flow of information to keep the State informed of the status of any monitoring program. The State will be informed through the OCS Advisory Board, through State liaison officers, and through the activities of the Pacific Outer Continental Shelf Office.

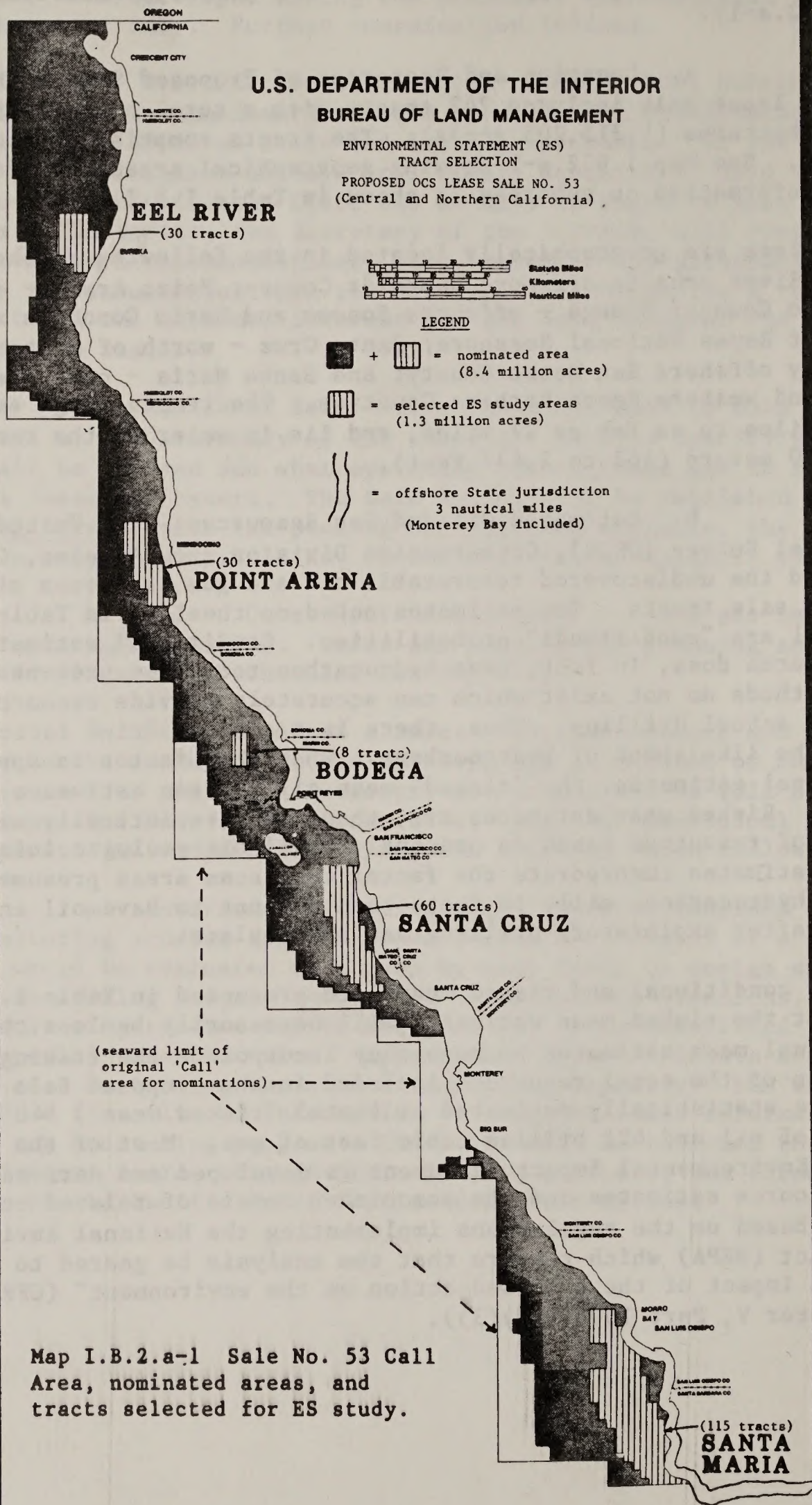
2. Description of the Proposed Sale Area: This proposed federal action is a May 1981 sale of oil and gas leases on the Outer Continental Shelf (OCS) offshore central and northern California (see Map I.B.2.a-1).

a. Location and Hectarage of Proposed Sale: The proposed lease sale includes 242 tracts with a total area of about 532,258 hectares (1,315,205 acres). The tracts comprise five distinct subareas. See Map I.B.2.a-1 showing geographical areas included in the Sale. Information on subareas is shown in Table I.B.2.a-1.

The subareas are geographically located in the following offshore areas: the Eel River area is offshore Humboldt County; Point Arena - offshore Mendocino County; Bodega - offshore Sonoma and Marin Counties north of the Point Reyes National Seashore; Santa Cruz - north of Monterey Bay, generally offshore San Mateo County; and Santa Maria - offshore San Luis Obispo and western Santa Barbara Counties. The tracts range seaward from 3 miles to as far as 27 miles, and lie in water depths ranging from 50 to 750 meters (162 to 2,437 feet).

b. Estimated Oil and Gas Resources: The United States Geological Survey (USGS), Conservation Division, Los Angeles, California estimated the undiscovered recoverable oil and gas resources within the proposed sale tracts. The estimates noted on the left in Table I.B.2.b-1 are "conditional" probabilities. Conditional estimates assume that an area does, in fact, have hydrocarbon resources present. However, methods do not exist which can accurately provide resource amounts prior to actual drilling. Thus, there is a certain "risk factor" denoting the likelihood of hydrocarbons. When this factor is applied to conditional estimates, the "risked" mean oil and gas estimates are derived. Risked mean estimates are, then, the statistically expected amounts of resources based on presently available geologic information. Risked estimates incorporate the factor that some areas presumed to contain hydrocarbons will, in fact, turn out not to have oil and gas present after exploratory drilling has taken place.

Both the conditional and risked means are presented in Table I.B.2.b-1. Note that the risked mean estimates will necessarily be less than the conditional mean estimates because they incorporate the risking factor. Estimates of the total resources included in the proposed Sale are therefore statistically estimated at (total "risked mean") 548 million barrels of oil and 621 billion cubic feet of gas. Most of the analysis in this Environmental Impact Statement is developed and derived from the mean resource estimates and the associated levels of related activities. This is based on the regulations implementing the National Environmental Policy Act (NEPA) which require that the analysis be geared to "the probable impact of the proposed action on the environment" (CFR, Title 40, Chapter V, Part 1500.8(a)(3)).



Map I.B.2.a-1 Sale No. 53 Call Area, nominated areas, and tracts selected for ES study.

TABLE I.B.2.a-1

AREAS INCLUDED IN PROPOSED OCS SALE NO. 53

Area	Hectarage	No. of Tracts	Percent of Sale Area
Eel River	66,301	30 (No. 1-30)	12.46
Point Arena	68,872	30 (No. 31-60)	12.94
Bodega	18,432	8 (No. 61-68)	3.46
Santa Cruz	133,296	59 (No. 69-128)*	25.04
Santa Maria	245,357	115 (No. 129-243)	46.10
TOTAL	532,258	242	100.00

*Tract identified as No. 113 not on Federal OCS and has been excluded.

TABLE I.B.2.b-1

ESTIMATED MOST PROBABLE (MEAN) UNDISCOVERED RECOVERABLE
OIL AND GAS RESOURCES IN PROPOSED SALE AREA

Area	Oil (Million Barrels)	Gas (Billion Cubic Feet)	Oil (Million Barrels)	Gas (Billion Cubic Feet)
	<u>Conditional Mean</u>		<u>Risked Mean</u>	
Eel River	-	182.0	-	71.0
Point Arena	131.0	134.2	25.0	25.0
Bodega	23.2	22.1	8.0	8.0
Santa Cruz	123.0	123.0	113.0	113.0
Santa Maria	404.0	409.0	402.0	404.0
TOTAL	-	-	548.0	621.0

Source: USGS

It should be noted that POC Reference Papers 53-1 and 53-5 also include data on resource estimates. The estimates included in these Reference Papers are, for some basins, slightly lower than the conditional mean estimates in Table I.B.2.b-1. This is because these reports are based on a 20 year productive field life. Though it is projected that the vast majority of production would occur during this period, there would be likely a relatively small level of production beyond this 20 year period. This additional amount is incorporated into this table (I.B.2.b-1). However, differences between the two tables are quite negligible, involving a 1.9% difference for oil and 0.2% for gas.

Proposed Sale No. 53 represents a relatively unexplored OCS area. There is a high degree of uncertainty regarding the level of oil and gas resources which might be present in such OCS areas. Information is extrapolated from seismic investigations which attempt to establish the presence of oil and gas structures, but little substantive information is available because drilling has not taken place on most tracts. Under such circumstances, the resource estimates encompass a range of possibilities. When faced with conditions of uncertainty, a common statistical inference method that is used notes the values that arise out of a sampling procedure. Estimates of resource values can be based on such a sampling distribution of the expected resource base. USGS has developed such an estimate of the resource base for Sale No. 53. Table I.B.2.b-2 gives these estimates of oil and gas at the 95 and 5 percent confidence intervals. The lower figure in this table represents the minimum amount of oil and gas believed to exist, while the higher figure represents the maximum. Together they constitute the bounds of what is commonly termed the range. Note that these figures giving the high and low resource estimates in this table are "conditional" estimates, i.e., assuming hydrocarbons are present. They can only be compared to the conditional mean estimates in Table I.B.2.b-1, and, as can be seen, all the conditional mean estimates of that previous table fall somewhere within the middle range of this latter table.

TABLE I.B.2.b-2

ESTIMATES OF LOW AND HIGH RESOURCE LEVELS
IN PROPOSED SALE AREA
(Conditional Probabilities)

Area	Oil (Mil. Bbl.)	Gas (Bil. Cu. Ft.)
El River	---	63 - 356
Point Arena	87 - 205	86 - 215
Bodega	8 - 50	8 - 51
Santa Cruz	16 - 273	16 - 277
Santa Maria	89 - 784	89 - 795

Source: USGS

Future improvements in drilling technology and exploration science can affect estimates. Furthermore, changing economic conditions can materially affect the amount of economically recoverable resources. Planning for any offshore investment program involves an evaluation of exploration and development costs, operating expenses, price of oil and gas, taxes, royalty, and production rates. Differing assumptions regarding the future level of these factors would affect estimates of recoverable resources. Thus, estimates of resource potential used here are inherently speculative--particularly so in areas where geologic information is limited and technologic and economic factors are subject to future changes.

c. Projected Transport and Markets: Production of proposed OCS Sale No. 53 oil and gas is estimated to start in 1986 and continue until 2005 with the maximum total daily production occurring in 1990 for most of the areas. Resource supply, production, development, and transportation assumptions are based on the risked mean estimate of 548 million barrels (MM Bbl) of oil and 621 billion cubic feet of gas (Bcf) for the total sale area, unless otherwise noted. Note is made, where appropriate, in Section IV (Environmental Consequences) of the impacts on particular resource categories that would also result from the maximum and minimum estimates.

All oil production from this proposal is assumed to back out an equal amount of either foreign or Alaskan imports to California, making more oil available for other parts of the U.S. The following discussion details what are considered the most likely oil and gas transportation from each area. Alternative transportation scenarios are discussed in Section IV.A.8. (A more detailed discussion of all transportation scenarios is presented in Pacific OCS Reference Paper 53-1).

Gas from the Eel River area is assumed transported from offshore gathering lines to shore, continuing onshore for approximately 5 miles and then connecting with an existing gas line. No oil production is expected from the area.

Oil from the Point Arena area is expected to be transported by tankers to refineries in the San Francisco Bay area. Gas from the area could be transported to shore by pipeline and connect with existing gas lines.

The Bodega area could produce oil and gas. The volume of gas, however, is expected to be low, making it likely that gas would be separated at the production facilities and reinjected. Oil could be transported by barge to refineries in the San Francisco Bay Area.

Gas from the Santa Cruz area is assumed transported from offshore gathering lines to shore, continuing onshore for approximately 7 miles and connecting with existing gas pipelines. Oil is assumed transported by gathering lines to an offshore storage and treating facility. It

would then be pipelined onshore following an existing pipeline route and connecting with refineries in the San Francisco Bay Area.

Gas and oil from the Santa Maria area is assumed transported by gathering lines to an offshore storage and treating facility. The gas could then be pipelined onshore for approximately 14 miles and then connect with an existing gas pipeline. The oil pipeline would connect onshore with the proposed Santa Barbara County pipeline at Las Flores Canyon. The Santa Barbara pipeline could connect with refineries in the Los Angeles basin.

Once Sale No. 53 resources are landed, it is anticipated that the crude would be refined in California. California refineries have the capability to process this crude. The limiting factors would be the crude's sulfur content and American Petroleum Institute (API) gravity rating. Because California regional crude is relatively sour (high sulfur) and heavy (low API), sweet and light crudes are needed by certain refineries in order to balance feedstocks. Since the worldwide production trend is toward the heavier and more sour crudes, incentives would likely arise which could cause refineries to invest in facilities enabling them to process those crudes which would be an increasing proportion of total supply.

California presently has a refining capacity of 2.45 million barrels per calendar day (B/D), (Cantrell 1979) representing about 83 percent of total capacity in Petroleum Administration for Defense District (PADD) V (This includes the states of Washington, Oregon, California, Nevada, Arizona, Alaska, and Hawaii). While no new refineries are expected in California as a result of this proposal, the analysis does assume an annual growth rate of 1.6 percenta in refining capacity in the State --the result of replacing existing obsolete equipment with more efficient units. Even by factoring in present capacity limitations, the 20-year average production from Sale No. 53 represents a relatively small 6 percent of capacity in the Bay Area and 8.2 percent for the Los Angeles Basin.

It is also anticipated that the economics of petroleum transport make it likely, whenever possible, that production from the California OCS would be refined in the nearshore regions. Furthermore, if the proposed "Northern Tier" pipeline project is constructed, it would reduce the amount of Alaskan North Slope (ANS) crude that is refined in California and allow increased opportunities for the refining of crude from the California OCS. The proposed pipeline would include a marine offloading and storage terminal at Low Point, Washington, and a 2,400 km (1,491

^a"Annual Refining Report", L. R. Aalund, Oil and Gas Journal, March 26, 1979, Vol. 77, No. 13.

mile) pipeline across Idaho, Montana, and North Dakota to a terminal at the Clearbrook, Minnesota, distribution center. The proposed 40- and 42-inch pipeline would serve the refinery needs of northern tier states and distribute ANS (and other) crudes that would be in excess of the needs of West Coast states. The pipeline would have an initial capacity of 709,000 B/D, with an expansion capability to 933,000 B/D.

California OCS oil and gas has, and will likely continue, to find a variety of intermediate and final product uses. The particular composition of end uses that might result from oil and gas produced in the region depends on institutional and economic relationships that would evolve during the life of the project. Generally, products of California refineries are consumed within the State, though Nevada and Arizona are also logical markets for the products from California refineries.

d. Basic Development Assumptions: It is assumed the proposed lease sale would lead to exploration for and potential development and production of oil and gas resources in the central and northern California offshore area. The oil and gas operations that would normally take place begin with geophysical surveys and geological sampling programs designed to study the age, structure, and hydrocarbon potential of the area. Shallow core holes, bottom sampling and deep stratigraphic test holes would be drilled to provide additional geologic and geochemical information.

After leasing, exploratory (wildcat) wells would be drilled on the best petroleum prospects as suggested by the geological and geophysical data in order to locate, delineate, and characterize hydrocarbon reservoirs. These wells are usually drilled from semisubmersibles, jackups, and drillships. All three are assumed in this analysis. If commercially productive reservoirs are located, development wells are normally drilled from fixed platforms. These wells include production wells and a variety of service wells which increase the productivity of the field. The exploration phase of oil operations requires docking and onshore equipment storage, service facilities, helicopters, and attendant facilities. The development phase requires offshore and onshore hydrocarbon storage and processing facilities as well as pipelines and/or deepwater tanker ports.

Using the resource estimates noted in Section I.B.2.b, the expected development timetable for each of the five areas is given in Table I.B.2.d-1. The numbers in each category are given in a series of three for each year, expressing the amount that would result from the low, most probable, and high resource estimates, respectively.

Using these development timetables, resource estimates, statistical data on past oil spills, and scenarios considered reasonable and appropriate, the following further developmental assumptions were made by USGS and

TABLE I.B.2.d-1

DEVELOPMENT TIMETABLE
(Low-Most Probable-High Resource Estimates)

	Exploratory Wells	Delineation Wells ^a	Development Wells	Platforms	Subsea ^b
Eel River^e:					
1981	1-1-2				
1982	1-2-3	1-3- 5			
1983	1-1-1	2-3- 5			
1984		2-1- 4			
1985					
1986			4- 6- 6	0-1-1	1-0-0
1987			4-12- 6		0-1-1
1988			0- 0- 6	0-0-1	
1989			0- 0- 6		
Total:	3-4-6	5-7-14	8-18-24	0-1-2	1-1-1
Point Arena^e:					
1981	1-1-2				
1982	2-2-3	2-3- 5			
1983	1-2-1	2-4- 5			
1984		1-2- 3			
1985					
1986			14-14- 14	2 ^c -2 ^c -2 ^c	
1987			28-28- 28	0 -0 -0	
1988			10-28- 42	0 -0 -1	1-1-1
1989			6-17- 16		0-1-1
1990			0- 0- 8		
Total:	4-5-6	5-9-13	58-87-108	2 -2 -3	1-2-2

TABLE I.B.2.d-1 (Cont.)

	Exploratory Wells	Delineation Wells ^a	Development Wells	Platforms	Subsea ^b
Bodega^e:					
1981	1- 1- 1	0- 1- 2			
1982	1- 1- 2	1- 2- 5			
1983		2- 1- 4			
1984					
1985					
1986			8- 10- 10	2 ^c -2 ^c -2 ^c	
1987			8- 16- 20		
1988			0- 0- 10	0 -0 -1	
1989			0- 0- 3		
Total:	2- 2- 3	3- 4-11	16- 26- 43	2 -2 -3	0-0-0
Santa Cruze^e:					
1981	3- 4- 5				
1982	5- 6- 8	4- 6- 8			
1983	4- 5- 5	6-10-12			
1984	2- 2- 2	3- 8-10			
1985	0- 1- 1	3- 3- 7			
1986		1- 0- 4	5- 8- 16	2 ^c -2 ^c -3 ^c	0-1-0
1987		0- 0- 2	10- 26- 48	1 -1 -2	0-0-1
1988			5- 36- 68	0 -1 -2	0-0-1
1989			10- 36- 60	1 -1 -1	
1990			2- 26- 36		
1991			0- 5- 9		
Total:	14-18-21	17-27-43	32-137-237	4 -5 -8	0-1-2

TABLE I.B.2.d-1 (Cont.)

	Exploratory Wells	Delineation Wells ^a	Development Wells	Platforms	Subsea ^b
<hr/>					
Santa Maria ^e :					
1981	3- 4- 5				
1982	5- 6- 8	4- 6-10			
1983	3- 5- 6	6-12-14			
1984	2- 3- 3	3- 8-11			
1985	0- 1- 1	3- 4- 8			
1986		0- 3- 6	14- 18- 18	3 ^c - 3 ^c - 3 ^c	
1987		0- 0- 3	35- 63- 72	1 - 4 ^d - 5 ^c	
1988			23- 82-116	1 - 2 - 4	0-1-1
1989			30- 69-115	2 - 2 - 4 ^d	0-0-0
1990			30- 64- 88	0 - 2 - 2	0-1-1
1991			5- 46- 66	0 - 0 - 2	0-0-1
1992			0- 9- 40		
1993			0- 0- 8		
Total:	13-19-23	16-33-52	137-351-523	7 -13 -20	0-2-3

^aThese are sometimes also termed exploratory wells.

^bSubsea or floating production system.

^cOne of which is an offshore storage and loading facility.

^dOne of which is an alternate gas processing platform.

^eThese estimates are based on conditional resource estimates. The following factors should be used in making conversions to the requirements in each basin based on risked resource estimates: Eel River, 0.39; Point Arena, 0.19; Bodega, 0.35; Santa Cruz, 0.92; and Santa Maria, 0.99.

Source: U.S. Geological Survey

BLM: 1) there would be a statistically expected 2.29 oil spills of 1,000 barrels or greater from the total sale area over the life of the project^b; 2) no petroleum refineries are expected to be constructed in California as a result of the proposed sale; 3) there would be four major onshore operations facilities required (Humboldt Bay, San Francisco Bay, Morro Bay and Port Heuneme. See Section IV.A.2.a); 4) some pipelines would be required and certain levels of formation water, drilling muds and cuttings, etc., would result from the proposed sale. These items are detailed in Table I.B.2.d-2. The environmental consequences are based on all these assumptions.

Many variables would affect the types and locations of facilities that would be required to support the exploration, development, and production of oil and gas resources, if discovered, and a number of facility combinations are possible. Among these variables are the policies and controls of local, regional, State, and Federal governments, and of private, corporate, institutional, and industrial landholders.

Onshore operations bases are assumed to be phased into operation preparatory to development and production activity, i.e., bases would become operational by 1985. The location of operations bases would depend largely upon the location of producing fields in relation to the physical environment. All site-specific facilities would be subject to all existing Federal, State, and local regulations, land use plans, policies, or controls.

An important determinant of the economic feasibility of producing OCS oil and gas is the cost of exploration, development, and production. These costs can vary widely within and between OCS provinces. The situation is further complicated by a number of factors which potentially affect costs: the type or combination of hydrocarbons present, the relationship between production decline rates and costs, location considerations (e.g., climate and water depth), and the type of recovery and transportation technology used. For a detailed analysis of OCS cost factors, (see Mansvelt Beck and Wiig 1977).

With these factors in mind, Table I.B.2.d-3 is illustrative of the possible investment level anticipated resulting from proposed Sale No. 53. This table assumes the resource levels noted in Section I.B.2.b, and, like Table I.B.2.d-1, gives the investment amounts at the low, most probable, and high resource levels.

^bThe number 2.29 oil spills merely takes into account that varying numbers arise as a result of each run of the oil spill simulation model. Each run gives some expected number of spills. The average of all numbers is 2.29. More detailed discussion of the oil spill analysis can be found in Section IV.A.1 and in Pacific OCS Reference Paper 53-2.

TABLE I.B.2.d-2

DEVELOPMENTAL ASSUMPTIONS OVER PROJECT LIFE
(Most Probable Resources)

Area	Pipeline Offshore ^a (Miles)	Pipeline Onshore (Miles)	Sediment ^b (Cu.Yds.)	Drill Cuttings (000 Bbls.)	Drilling Mud (000 Bbls.)	Formation Water (Mil Bbl)	Sewage (Gal/Day)
Eel River	13	5	49,900	40.0	18.8	—	2,000-4,000
Point Arena	17	33	49,900	145.1	56.3	23.4	2,000-4,000
Bodega Bay	—	—	—	43.2	18.2	4.5	2,000-4,000
Santa Cruz	31	94	81,200	254.2	110.1	29.6	6,000-14,000
Santa Maria	51	68	61,500	495.0	187.8	96.5	12,000-36,000
Total	112	200	242,500	977.5	391.2	154.0	24,000-62,000

^aIncludes offshore delivery and gathering lines.

^bAmount of sediment disturbed with pipeline burial.

The assumptions regarding development (Tables I.B.2.d-1, -2, -3), it must be emphasized, are not predictions of the future, but are, rather, illustrations of what could develop if all these assumptions are correct. The unproved nature of oil and gas resource estimates leads to the use of many assumptions in this impact analysis. Consequently, potentially affected communities should use particular quantities with caution in connection with planning activities.

TABLE I.B.2.d-3

ESTIMATED INVESTMENT - SALE NO. 53
(\$ Millions)

	Exploration & Delineation Wells	Develop- ment Wells ^a	Platform & Production Equipment	Offshore Storage Facilities	Pipeline Laying
Low Resources					
Eel River	31.5	31.2	26.4	-	5.9
Point Arena	35.5	70.2	543.1	30.0	13.3
Bodega	18.0	14.4	68.0	15.0	-
Santa Cruz	114.1	26.8	114.0	16.0	1.8
Santa Maria	107.0	109.6	2,500.0	15.0	7.8
Total:	306.1	252.2	3,251.5	76.0	28.8
Most Probable Resources					
Eel River	43.3	22.5	96.6	-	7.3
Point Arena	54.0	125.4	599.0	30.0	16.7
Bodega	21.4	23.4	68.0	15.0	-
Santa Cruz	164.7	128.4	194.4	16.0	62.1
Santa Maria	191.0	320.4	3,557.4	30.0	112.6
Total:	474.4	620.1	4,515.4	91.0	198.7
High Resources					
Eel River	78.6	34.0	613.2	-	11.5
Point Arena	72.5	119.5	1,059.6	30.0	24.4
Bodega	49.1	38.7	136.0	15.0	0.9
Santa Cruz	232.4	220.9	308.2	16.0	95.9
Santa Maria	274.6	486.6	5,192.6	30.0	112.6
Total:	707.2	899.7	7,309.6	91.0	245.3

Source: U.S. Geological Survey and Bureau of Land Management.

^aThis includes wells on platforms and for subsea completions. The unit cost varies considerably. Thus, depending on the two types used in the scenario, investment in dollar terms may not correspond linearly to resource levels.

3. Regulatory Framework

a. Legal Mandates and Authority

OCS Lands Act. The Outer Continental Shelf Lands Act of 1953 (67 Stat. 462), as amended (P. L. 95-372; 92 Stat. 629), established Federal jurisdiction over submerged lands on the Outer Continental Shelf (OCS) seaward of State boundaries (generally 3 geographic miles seaward of the coastline). Under the OCS Lands Act, the Secretary of the Interior is responsible for the administration of mineral exploration and development on the OCS. It empowers the Secretary to grant leases to the highest qualified responsible bidder(s) on the basis of sealed competitive bids and to formulate such regulations as necessary to carry out the provisions of the act.

The act, as amended, provides guidelines for implementing an OCS oil and gas exploration and development program. From a national perspective, the basic goal of the act is to expedite exploration and development of the OCS in order to achieve national economic and energy policy goals, assure national security, reduce dependence on foreign sources of oil, and maintain a favorable balance of payments in the world trade. With respect to implementing a leasing program, this goal is constrained by the following considerations: (1) the receipt of fair and equitable return on oil and gas resources; (2) preservation and maintenance of competition; and (3) balancing orderly energy resource development with protection of the human, marine, and coastal environments. The information presented in this section will focus on the balancing of orderly resource development and environmental protection.

The Secretary of the Interior designated the Bureau of Land Management as the administrative agency responsible for the leasing of submerged Federal lands, and the Geological Survey (USGS) for the supervision of offshore operations after lease issuance. Regulations administered by the Bureau of Land Management govern the leasing of mineral deposits on the OCS and the granting of rights-of-way for pipelines in the OCS are contained in 43 Code of Federal Regulation (CFR), Part 3300. Regulations administered by the Geological Survey govern the conduct of mineral operations which are contained in 30 CFR Part 250, and are implemented by OCS operating orders on an area-specific basis.

The following discussion summarizes major requirements of the act and its implementing regulations, which mitigate some of the possible adverse impacts resulting from this proposal.

1. In the enforcement of the safety, environmental, and conservation laws and regulations, the Secretary shall cooperate with the relevant departments and agencies of the Federal Government and of the affected States.
2. The Secretary is authorized to suspend or temporarily prohibit an operation or activity pursuant to a lease or permit.
3. The Secretary is authorized to cancel a lease or permit.

4. The Secretary is authorized to issue regulations for unitization, pooling, and drilling agreements.
5. The Secretary is authorized to issue regulations to prevent OCS operations from adversely affecting the air quality of any State.
6. The Secretary may cancel a nonproducing lease for the owner's failure to comply with any of the provisions of the act, the lease, or regulations under the act.
7. The Secretary may initiate judicial proceeding to cancel a producing lease because of the owner's failure to comply with any of the provisions of the act, the lease, or regulations under the act.
8. Rights-of-way may be approved under such regulations and upon such conditions as may be prescribed by the Secretary, assuring maximum environmental protection by utilization of the best available and safest technologies.
9. Exploration must be undertaken pursuant to an approved exploration plan. No permit for drilling may be issued until all affected states with approved coastal zone management programs have concurred with the consistency determination provided by the lessee.
10. Geological explorations on unleased areas of the OCS shall be allowed only if such exploration will not be unduly harmful to aquatic life in the area, result in pollution, create hazardous or unsafe conditions, unreasonably interfere with other uses of the area, or disturb any site, structure, or object of historical or archeological significance.
11. Governors of affected States may submit recommendations to the Secretary regarding the size, timing, or location of a proposed lease sale, or with respect to a proposed development and production plan.
12. The Secretary is authorized to enter into cooperative agreements with affected States for several purposes, including but not limited to, sharing of information, joint utilization of available expertise, the facilitating of permit procedures, joint planning and review, and the formation of joint surveillance and monitoring arrangements relevant to OCS operations, both onshore and offshore.
13. The Secretary shall conduct a study of any area or region included in any oil and gas sale in order to establish information needed for assessment and management of environmental impacts on the human, marine, and coastal environments of the OSC and the coastal area which may be affected by oil and gas development in such area or region.

14. Subsequent to the leasing and developing of any area or region, the Secretary shall conduct additional studies to establish environmental information and shall monitor the human, marine, and coastal environments of such area or region.

15. The Secretary shall consider relevant environmental information in making decisions, in developing appropriate regulations and lease conditions, and in issuing operating orders.

16. In exercising their respective responsibilities, the Secretary and the Coast Guard shall require, on all new drilling and production operations and, wherever practicable, on existing operations, the use of the best available and safest technologies which the Secretary determines to be economically feasible, wherever failure of equipment would have a significant effect on safety, health, or the environment except where the Secretary determines that the incremental benefits are clearly insufficient to justify the incremental costs of utilizing such technologies.

17. The holder of a lease or permit shall maintain all operations within such lease area or within the area covered by such permit in compliance with regulations intended to protect persons, property, and the environment on the OCS.

18. The Secretary of the Interior, the Secretary of the Department in which the Coast Guard is operating, and the Secretary of the Army shall enforce safety and environmental regulations promulgated under the act. The Secretary and the Coast Guard shall promulgate regulations for onsite inspections of OCS facilities.

19. Any person having a valid legal interest which is or may be adversely affected may commence a civil action to compel compliance with the OCS Lands Act against any person, including the United States, for any alleged violation of any provision of the OCS Lands Act, or regulation promulgated thereunder, or terms of any permit or lease issued under the OCS Lands Act.

20. The Attorney General or a U.S. Attorney may institute a civil action for a temporary restraining order, injunction, or other appropriate remedy to enforce any provisions of the OCS Lands Act, regulation or order issued under the act or any terms of a lease, license, or permit issued under the act. Penalties available include:

- a. A civil penalty of not more than \$10,000 for each day of noncompliance;
- b. A fine of not more than \$100,000 or imprisonment for not more than 10 years, for any person who knowingly and willfully (1) violates any provision of the act, any term of a lease, license, or permit issued pursuant to the act, or any regulation or order issued under the authority of the act designed to protect health, safety,

or the environment or conserve natural resources, (2) makes any false statement, representation, or certification in any application, record, report, or other document filed or required to be maintained under this act, (3) falsifies, tampers with, or renders inaccurate any monitoring device or method of record required to be maintained under this act, or (4) reveals any data or information required to be kept confidential by this act.

21. Prior to development and production of an oil and gas lease, the lessee shall submit a development and production plan to the Secretary for approval.

22. The Secretary shall disapprove a development and production plan if:

- a. the lessee fails to demonstrate he can comply with requirements of the OCS Lands Act or other applicable Federal law;
- b. activities described do not receive a consistency concurrence by a State with an approved CZM plan;
- c. operations threaten national security or defense; or
- d. (1) exceptional geologic conditions, exceptional values in the marine or coastal environment or other exceptional conditions exist, and that implementation of the plan would probably cause serious harm or damage to life, to property, to any mineral deposits,....or to the marine, coastal, or human environments; (2) the threat of harm or damage will not disappear or decrease to an acceptable extent within a reasonable period of time; and (3) the advantages of disapproving a plan outweigh the advantages of development and production.

23. The Secretary shall not grant a license or permit for any activity in such a plan affecting any land or water use in the coastal zone of a State with an approved Coastal Zone Management plan, unless the State concurs or can be presumed to concur with the consistency certification accompanying such plan.

24. The Secretary shall, from time to time, review each development and production plan. If the review indicates that the plan should be revised to meet the requirements of section 25 of the OCS Lands Act, the Secretary shall require such revision.

25. The Secretary shall provide affected States with information to assist them in planning for the onshore impacts of possible oil and gas development and production.

26. The Secretary of the Department of Transportation shall

administer the Offshore Oil Spill Pollution Fund establishing compensation for injuries caused by oil discharge from an offshore facility or vessel.

27. The Secretary of the Department of Commerce shall administer the Fishermen's Contingency Fund which provides compensation for damage to fishermen's gear or vessels resulting from oil and gas exploration, development, and production.

Federal/State Coordination. The OCS Lands Act, as amended, provides a statutory foundation for the Department's policy of coordination of OCS activities with affected States and, to a more limited extent, local governments. At each step of the procedures that lead to lease issuance, participation from affected States and other interested parties is encouraged and sought. Set out below is a detailed discussion of coordination mechanisms required by the OCS Lands Act.

The Secretary of the Interior is required to invite and consider suggestions from the Governor of any affected States during preparation of any proposed leasing program for review and comment prior to its publication in the Federal Register. The Secretary is required to provide a written response to any request from a Governor for modification of a proposed leasing program. State and local governments may comment directly on a proposed leasing program in its published form. The Secretary is obligated to establish procedures for review of proposed leasing and periodic consultation with State and local governments (Section 18).

Within 60 days after notice of a proposed lease sale or receipt of a development and production plan, the Governor of any affected State may make recommendations to the Secretary with regard to the size, timing, or location of the proposed lease sale or development and production plan. If the Secretary determines that any such recommendations provide for a reasonable balance between the well-being of the citizens of the affected State and the national interest, he must accept them. The Secretary must also respond to the Governor in writing, giving his reasons for accepting, rejecting, or modifying the Governor's recommendations. The Secretary may enter into cooperative agreements with affected States, for purposes consistent with the act and other applicable Federal law (Section 19).

When soliciting nominations for the leasing of lands within 3 miles of the seaward boundary of any coastal State, additional information is to be provided to the Governor of those States. The Governor must be informed of the identity of and schedule for the area proposed for leasing; the geographical, geological and ecological characteristics of the area within 3 miles of the seaward boundary; an estimate of oil and gas reserves in these areas; and any field, trap, or geologic structures thought to be located in these areas. After the close of the call period, the Governor is informed of any area which merits further consideration for leasing (Section 8(g)).

Under Section 25 of the act, the Secretary must submit copies of

development and production plans to the Governor of any affected State for review. The State then has 60 days to provide comments and recommendations to the Secretary. Section 11 of the act and the regulations contained in 30 CFR 250.34 also require that any exploration plans submitted to the Secretary must be approved or disapproved within 30 days. Written comments from the Governor of an affected State will be considered prior to approval action if they are timely.

Under section 26 of the act, the Secretary must make available to affected States a summary of data to aid them in anticipating possible onshore effects of OCS development and production. The summary includes estimates of oil and gas reserves in areas leased or to be leased, estimated size and timing of development, pipeline location, and the general location and nature of onshore facilities.

The act also requires preparation and transmittal to each affected State of an index of all relevant actual or proposed programs, plans, reports, environmental impact statements, tract nominations, and other lease sale information. On request, the Secretary must send copies of these documents to the affected State.

b. Authorities of Federal Regulatory Agencies

Department of the Interior. BLM and USGS are departmental agencies with direct OCS regulatory and enforcement authority. BLM implements the OCS leasing regulations under 43 CFR Part 3300 and cooperates with USGS and other Federal agencies to develop special stipulations that apply to either specific leases or all leases within the proposed lease areas. These stipulations address such matters as cultural and biological resources, pipeline rights-of-way, disposition of drilling wastes, and equipment identification. In addition to issuing leases, BLM issues rights-of-way for common carrier pipelines on the OCS. BLM also issues permits and designates an authorized officer to manage each permit relative to protection of coral in the vicinity of proposed OCS operations.

USGS administers regulations governing lease operations, including exploration and development of the OCS under 30 CFR Part 250. These regulations are the basis for OCS Orders which apply to operations in the proposed lease area. See Section I.B.5 for a discussion of USGS Orders (effective January 1, 1980) for this proposed lease area. Additionally, USGS maintains jurisdiction over producer-owned gathering lines and flowlines on the OCS.

The Department of the Interior has promulgated regulations describing a program for regulating air pollution from OCS operations. The final regulations which became effective as of June 2, 1980, were published in the Federal Register on March 7, 1980 and will be codified as 30 CFR 250.57.

The U.S. Fish and Wildlife Service (USFWS) shares responsibilities with other agencies for protection of fish and wildlife resources and their habitats, and acts in an advisory capacity in the formulation of OCS

leasing stipulations. It also provides recommendations to the Corps of Engineers in the issuance of Federal permits to industry for construction in navigable waters. USF&WS is also responsible for the protection and stewardship of certain species covered under the Endangered Species Act of 1973, as amended.

U.S. Army Corps of Engineers. The OCS Act provides authority to the Secretary of the Army to prevent obstruction to navigation in U.S. navigable waters, and to prevent obstructions caused by structures located on the OCS. Section 10 of the Rivers and Harbor Act of 1899 (30 Stat. 1151) requires that permits be issued for all offshore construction, including pipelines, in U.S. navigable waters.

Permits must also be issued for onshore facilities in which dredging and filling of U.S. navigable waters are involved. Structure permits for exploration drilling vessels and for fixed and mobile platforms are issued by the Corps. Permits for structures in State waters must consider environmental requirements before the issuance pursuant to Section 404 of the Clean Water Act. Section 404 also delegates regulatory authority to the Secretary of the Army over discharge of dredged or fill material in wetlands.

Department of Transportation (DOT). The OCS Lands Act grants authority to the Coast Guard to promulgate and enforce regulations covering lighting and warning devices, safety equipment, and other safety-related matters pertaining to life and property on fixed OCS platforms and drilling vessels. Through the Coast Guard, the Department of Transportation advises the Corps of Engineers on the issuance of permits and the placement of offshore structures. Under the Port and Tanker Safety Act of 1978, the Coast Guard has the authority to establish shipping safety fairway and other ship routing systems in which OCS structures may be prohibited. The Coast Guard also has jurisdiction to enforce the Clean Water Act on the OCS.

Under the Clean Water Act, the U.S. Coast Guard approves the procedures to be followed and the equipment used for the transfer of oil from vessel to vessel and between onshore and offshore facilities and vessels. The Coast Guard also conducts pollution surveillance patrols to detect oil discharges within territorial and contiguous waters and has enforcement authority over violations. The Coast Guard also has strike team responsibilities should an oil spill occur.

The Materials Transportation Bureau is responsible for establishing and enforcing design, construction, operation, and maintenance regulations for pipelines. The Department of Transportation's responsibility and authority is further defined in a Memorandum of Understanding between it and the Department of the Interior.

Department of Commerce. The Department of Commerce, through the National Oceanic and Atmospheric (NOAA) and the National Marine Fisheries Service (NMFS), is responsible for protection of marine fishery resources and their habitats, and for providing recommendations to the Corps of Engineers regarding the issuance of permits in navigable waters.

The Department's responsibility and authorities related to OCS development include the Fishery Conservation and Management Act of 1976, the Marine Mammal Protection Act of 1972, the Endangered Species Act of 1973, the Fur Seal Act of 1966, Title II of the Marine Protection, Research, and Sanctuaries Act 1972 ("Comprehensive Research on Ocean Dumping"), and the National Ocean Pollution Research and Development and Monitoring Act of 1978.

Coastal Zone Management Act. The Department of Commerce also administers the Coastal Zone Management Act (CZMA) of 1972, as amended (16 USC 1451-1464), through the National Oceanic and Atmospheric Administration. The CZMA encourages the development and implementation of coastal management programs for the sound management of State coastal resources by providing a system of grants, loans, and loan guarantees to the States. Once developed, the program is then submitted to the Secretary of Commerce for approval after which the Coastal Zone Management Program (CZMP) may be implemented. California has an approved CZMP which is currently being implemented (see Section I.8.a.).

Section 307 of the CZMA contains the Federal consistency provision which imposes certain requirements on Federal agencies to comply with approved State coastal zone management programs.

Section 307(c)(1) requires Federal agencies conducting or supporting activities directly affecting the coastal zone be consistent to the maximum extent practicable with a State's coastal program. NOAA's Federal consistency regulations (15 CFR 930.30-.44) require Federal agencies to review each activity to assess whether it would "directly affect" the coastal zone of a State with an approved CZM program. If the Federal activity would have direct effects, the Federal agency must prepare a consistency determination and submit it to the State. If the Federal activity would have no direct effects, the Federal agency is to make a negative determination.

Section 307(c)(3)(A) prohibits Federal agencies from issuing a license or permit for any activity that affects a land or water use in the coastal zone of a State with an approved CMP until the State has agreed that the activity subject to the license or permit is consistent with the approved program or the Secretary of Commerce has overridden the State's objections to the activity.

Section 307(c)(3)(B) requires that no Federal license or permit for an activity described in detail in an OCS exploration plan or development and production plan which affects a land or water use in the coastal zone of a State with an approved CMP may be approved until the State has concurred with the consistency determination made by the lessee or the Secretary of Commerce has overridden the State's objections.

Finally, under Section 307(d), Federal agencies may not provide Federal assistance for proposed projects that are inconsistent with a State's coastal management program except upon certain findings by the Secretary of Commerce.

Regarding the Section 307(c)(1) requirement, the Department of Justice (DOJ) in response to a joint request by the Department of Commerce and Interior, issued an opinion on April 20, 1979 that (1) recent amendments to the CZM Act and the OCS Lands Act do not affect the application of Section 307(c)(1) to OCS pre-leasing activities, (2) that 307(c)(1) applies only to activities directly affecting the Coastal Zone, and (3) that the DOJ is not authorized to resolve the essentially factual question as to whether and to what extent any of Interior's OCS pre-leasing activities directly affect the Coastal Zone.

The DOJ opinion also invalidated the then existent regulatory interpretation of "directly" as meaning first "significantly" and then "primarily secondarily and cumulatively." No new regulatory interpretation of the term "directly affecting" has yet been made. NOAA was requested to develop one in early 1980, but, to date, draft language has not been issued.

In May 1979, the Department of Interior found that none of the effects of the pre-lease activities associated with OCS Sale No. 48 (Southern California) would be "direct effects" and thus Interior issued a negative determination. The California Coastal Commission (CCC) disagreed with Interior's position and requested the Secretary of Commerce to use the authority of 15 CFR 930.110-.116 to mediate its disagreement with Interior. This mediation effort failed to resolve the CCC's disagreement.

On July 8, 1980, the CCC requested the Secretary of the Interior to submit a consistency determination for the pre-leasing activities associated with OCS Lease Sale No. 53. In a July 14, 1980 letter the Secretary responded that, depending on the facts of the Department's leasing proposal for the sale area, either a consistency determination or a negative determination will be made at the time the proposed notice is issued (currently scheduled for October 1980).

Department of Energy. With respect to Outer Continental Shelf leasing, and in consultation with the Secretary for the Interior, the Department of Energy (DOE) is authorized under the Department of Energy Organization Act (91 Stat. 565)(1977) to foster increased competition for leases, to implement authorized systems of bidding, to establish due diligence requirements for OCS operations, to set rates of production, and to determine amounts of OCS gas purchased and transported. DOE has broad authority over approval, design, and economies of common carrier gas pipelines.

In addition, the Department of Energy provides support to the Leasing Liaison Committee, whose function is to coordinate leasing policies of the Department of the Interior with DOI policies. Section 27 of the OCS Lands Act, as amended, requires DOI consultation with DOE.

The Federal Energy Regulatory Commission (FERC), within DOE, has the authority under the Natural Gas Act to issue certificates of public convenience and necessity for proposed projects involving the transportation or sale of natural gas in interstate commerce. All

natural gas produced from the OCS is considered to be interstate and therefore, is subject to FERC jurisdiction. The Natural Gas Act, the National Environmental Policy Act, and OCS Lands Act Amendments of 1978 all grant authority for or require that the FERC investigate the environmental effects of a proposed offshore project, as well as the potential gas reserves, the need for this gas, and the availability of capital to develop this resource. Also, the FERC is primarily responsible for administering and enforcing the Natural Gas Policy Act (NGPA) of 1978 (92 Stat. 3350). As applied to OCS matters, the NGPA provides new wellhead pricing controls for certain natural gas produced from the OCS.

Environmental Protection Agency. Under the Federal Water Pollution Control Act (FWPCA) Amendments of 1972, (86 Stat. 816), a National Pollution Discharge Elimination System (NPDES) was created and applies to discharges into the territorial seas, waters of the contiguous zone, and the oceans. The NPDES applies to fixed platforms and drillships, and any discharges from these sources would require a permit issued by the Environmental Protection Agency (EPA). Discharges of pollutants without the necessary permits from EPA are unlawful. Such an NPDES permit does not apply to discharge of pollutants from any vessels or floating craft, or subsurface injection wells for production purposes. Subsurface injection is subject to USGS regulations and operating orders.

The Clean Water Act (91 Stat. 1566) (1977), which amended the FWPCA, also applies to offshore operations and provides that lessees or operators may be held financially liable for damages due to oil spills. It provides for a liability up to \$50 million for actual costs of oil removal and cleanup (except where without fault of operator or owner), as well as replacement or restoration costs of natural resources damaged or destroyed by a spill.

EPA is also primarily responsible for facilities not related to transportation, such as terminal and storage facilities. Permits for any discharges would be issued by EPA or designated States according to established effluent guidelines. Provisions of the Clean Water Act also apply to onshore OCS-related facilities.

Interstate Commerce Commission. The Interstate Commerce Commission grants approval of the tariff rates for transportation of oil by common-carrier pipelines.

Relationship of the Proposed Sale to the Overall OCS Leasing Program. Section 18(a) of the OCS Lands Act, as amended, provides that "The Secretary. . . shall prepare and periodically revise, and maintain an oil and gas leasing program. . .". In compliance with the Act, the Secretary of the Interior submits a proposed leasing program to the Congress, the Attorney General, and the Governors of affected States. The leasing program consists of a schedule of proposed lease sales indicating, as precisely as possible, the size, timing, and location of leasing activity which will best meet national energy needs for the 5-year period following its approval or reapproval. The goal of the

leasing program is to provide for orderly development of OCS oil and gas resources and to maintain an adequate contribution of OCS production to the national supply in order to reduce dependence on foreign oil.

The United States has three overriding energy objectives outlined in the National Energy Plan:

- as an immediate objective that will become even more important in the future, reduce dependence on foreign oil and vulnerability to supply interruptions;
- in the medium term, to keep U.S. imports sufficiently low to weather the period when world oil production approaches its capacity limitation; and
- in the long term, to have renewable and essentially inexhaustible sources of energy for sustained economic growth.

Full development of OCS resources is an integral part of that plan (the National Energy Plan, Executive Office of the President, Energy Policy and Planning, 1977).

The Final EIS on the 5-year OCS Oil and Gas Lease Schedule was released in June 1980.

The 5-year OCS leasing program does not represent a decision to lease in a particular area. It represents only the Department's intent to consider leasing certain areas, and to proceed with the leasing of such areas if it should be determined that leasing and development in such areas would be environmentally and technically sound.

c. Intergovernmental Planning Program. The Department of the Interior has instituted a program designed to improve and formalize coordination and the flow of technical information required for timely decision making by the various parties having interests and permitting authority regarding OCS hydrocarbon leasing, development, and transportation. This program, the Intergovernmental Planning Program (IPP) for OCS Oil and Gas Leasing, Transportation and Related Facilities, provides information for three major OCS program elements administered by BLM: 1) the OCS leasing process, 2) the OCS environmental studies program, and 3) transportation planning for OCS oil and gas. This information is in the form of recommendations from technical working groups within each of the six OCS leasing regions (North Atlantic, Mid Atlantic, South Atlantic, Gulf of Mexico, Pacific, and Alaska) to the Secretary of the Interior through the Director of BLM. The IPP is the mechanism for coordinating BLM field level responsibilities with State and local governments, industry and other Federal agencies and does not replace or affect existing authorities, coordination procedures, or responsibilities.

The IPP includes both pre-sale and post-sale coordination. Included in pre-sale activities are recommendations on environmental studies, tract selection, EIS preparation, and stipulation development. The post-sale

activities included in the IPP coordination effort are: providing for early oil and gas transportation planning; identifying information needs for transportation routes, mode, and mix decisions; and recommending studies to obtain this information.

Regional Technical Working Group (RTWG) Committees are set up in each of the six leasing regions. California, Oregon, and Washington comprise the Pacific States region. These committees are part of the National OCS Advisory Board.

Each Regional Technical Working Group Committee is made up of representatives of six Federal agencies (Bureau of Land Management, U.S. Geological Survey, Environmental Protection Agency, National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, and U.S. Coast Guard), the States within the region, industry, and special and private interests. The committee is co-chaired by the BLM and a State representative. The members work together to provide recommendations on a regional scale. Once a marketable discovery is made in an area, a State Technical Working Group is instituted as a Subcommittee of the Regional Technical Working Group Committee. The Subcommittee serves as a forum for information exchange for site-specific planning activities, including recommending designations of transportation corridors and the location of possible sites for associated onshore facilities.

The Pacific States Regional Technical Working Group was initially convened October 30-31, 1979. To date, this Working Group has provided comments on the preliminary draft and Draft EIS. It is anticipated that recommendations pertaining to issues for the Secretarial Issue Document and lease stipulations will be elicited from the Working Group. The RTWG also provides a forum for coordination of information following a sale.

4. Environmental Studies: In 1973 BLM initiated an environmental studies program for the OCS to obtain marine and coastal environmental data relative to offshore resource development impacts. Since FY 1975 the annual Congressional Appropriations Bill for BLM has included funds for BLM's environmental studies program. The 1978 amendments to the OCS Lands Act provided the first legislative mandate for studies in support of OCS minerals development. Section 20 of this act requires the Secretary of the Interior to commence environmental studies at least 6 months prior to a lease sale in a frontier area. The ultimate goal of BLM's OCS environmental studies program is:

..."to establish information needed for prediction, assessment, and management of impacts on the human, marine, and coastal environments of the Outer Continental Shelf and the nearshore area which may be affected by oil and gas activities in such area or region" (43 CFR part 3301.7).

Early in 1978 BLM commissioned an ad hoc advisory committee to evaluate BLM's studies program and to prepare a national study design for future studies. The national study design is a framework to develop studies based on information needs required to answer specific management questions in the OCS leasing and development process. The new national study design was adopted by BLM and the Department of the Interior's OCS Advisory Board in 1978. The result of this program design in the central and northern California OCS area is an annual OCS Environmental Studies Plan prepared by BLM's Pacific OCS Office with coordination and review by other Federal and State agencies, local government, industry, and the general public. The California OCS Environmental Studies Plan for Fiscal Years 1982 and 1983 is available from the Pacific OCS Office. Described in the plan are BLM's past environmental studies activity in the area since 1976, on-going studies, current procurements for FY 1980, planned topics for FY 1981, and proposed BLM study topics for FY 1982 and 1983. Information on current projects and products available from past studies can be obtained from the Studies Staff Chief, Pacific OCS Office.

Table I.B.4-1 briefly lists the status of past and current BLM-funded studies in the central and northern California area. BLM is also funding several studies in the southern California area and in other OCS areas whose results can apply to the central and northern California OCS area.

BLM recognizes the large information gaps that exist for the central and northern California marine and coastal environment, as well as other OCS areas. The purpose of BLM's OCS studies program is to attempt to fill the significant information gaps for making OCS leasing and management decisions within the framework of the Department of Interior's OCS Leasing Schedule. BLM also recognizes that other agencies and organizations are studying the OCS and coastal environment and that the studies program should build on the results of other past and on-going

TABLE I.B.4-1

PAST, CURRENT, AND PROPOSED BLM OCS STUDIES ACTIVITIES
IN CENTRAL AND NORTHERN CALIFORNIA

<u>Study Title</u>	<u>Contract Award Date</u>	<u>Progress Reports</u>	<u>Draft Final Report Date</u>	<u>Final Report or Completion Date*</u>
<u>FY 1977:</u>				
1. Summary of Knowledge of the Central and Northern California Coastal and Offshore Areas	8/76			Completed 10/77
2. Recommendations for Baseline Research in Central and Northern California Relative for Offshore Development	8/76			Completed 3/77
<u>FY 1978:</u>				
Northern California and Southern Oregon Geological Hazards and Structure	2/78		9/79	8/80
<u>FY 1979:</u>				
1. A Summary and Analysis of Available Physical Oceanographic and Meteorologic Data for Offshore California	11/78	Quarterly Reports	6/80	8/80
2. An Ecological Characterization of the Central and Northern California Coastal Region	3/79	Monthly	1/80 (Preliminary) 6/80 (Revised)	10/80
3. Seabird Nesting and Seasonal Use Survey for Central and Northern California: Year I	4/79	Monthly- Maps 10/79	4/80 (Yr. I) 8/80 (Yr. I&II)	12/80
4. Geological Hazards Assessment for Proposed Areas for Lease Sale No. 53: Central and Northern California	7/79	Preliminary Maps 12/79	8/80	
5. Central and Northern California Marine Mammal and Seabird Study: Year I	9/79	Preliminary Report-6/80	6/81	
6. Air Quality Analysis of the Potential Impact of Offshore Oil and Gas Development in Central and Northern California	8/79	Monthly	1/80	3/80 7/80 (Supplement)

TABLE I.B.4-1 (Cont.)

<u>Study Title</u>	<u>Contract Award Date</u>	<u>Progress Report</u>	<u>Draft Final Report Date</u>	<u>Final Report or Completion Date*</u>
7. Assessment of Space and Use Conflicts on the U.S. Outer Continental Shelf between the Oil and Gas Industry and Commercial and Recreational Fishermen	9/79	Monthly	3/80 10/80	12/80
8. Land Use and Economic Impacts in the San Francisco Bay Area Region	9/79		12/79	2/80
<u>FY 1980:</u>				
1. West Coast OCS Meteorological Buoy Monitoring Network: Year I	6/80	Quarterly		
2. Central and Northern California Marine Mammal and Seabird Study: Year II	9/80			
3. California Commercial and Sports Fish Oil Toxicity Study: Year I	9/80			
4. Inventory and Evaluation of California Coastal Recreation and Aesthetic Resources: Year I	9/80			
5. California Seabird Oil Spill Behavior Study: Year I	9/80			
6. Oil Spill Vulnerability Risk Assessment to Protected Marine and Coastal Habitats in Central and Northern California	9/80			
7. Seabird Nesting and Seasonal Use Survey for Central and Northern California: Year II	3/80			
<u>Proposed FY 1981 Studies:</u>				
1. West Coast OCS Meteorological Buoy Monitoring Network: Year II				
2. Central and Northern California Marine Mammal and Seabird Survey: Year III				

*Completion date refers to the date the Pacific OCS Office recommends acceptance of final products and contract close-out to the BLM Contracting Office in Washington, D.C. Final report date refers to the date the final report is to be delivered to BLM for final review.

programs. Answering many questions over a wide range of issues for the dynamic marine and coastal environment is a lengthy and complex process. Some questions can be answered by relatively short-term studies, others only after a long-term effort, and still others may not be answered at all. BLM is planning and carrying out a long-term study effort in the central and northern California OCS and coastal area. This study effort is assembling available environmental information which is used at the various OCS leasing and development decision points and also aids in enhancing the prediction and assessment of significant impacts from proposed OCS oil and gas activities.

5. OCS Orders: OCS Orders are mandatory requirements and specifications for oil and gas exploration and recovery operations that supplement other regulations. Orders outline permit requirements, engineering criteria, surveillance, testing procedures, and information requirements. They are administered by the U.S. Geological Survey. Revisions were made to OCS Orders Nos. 1, 2, 3, 4, 5, 7, 8 and 12, effective January 1, 1980. The following is a brief description of each provision applicable to the Pacific Region.

OCS Order No. 1. This order requires identification of the operator, block designation and well number on platforms, structures, wells and mobile drilling units. It requires that the U.S. Coast Guard District Commander determine what aid-to-navigation devices are needed for subsea objects that are hazards to navigation or to the deployment of commercial fishing devices. It requires that equipment of sufficient size or of such a nature that it could be expected to interfere with commercial fishing gear if dropped overboard be marked, wherever practicable, with the owner's identification. (See the proposed regulations in the Federal Register, Vol. 45, No. 117, pp. 40669-40672, June 16, 1980.)

OCS Order No. 2. This order details drilling operation rules and permit requirements, including those for mobile drilling units (including fitness and ability to withstand oceanographic and meteorologic conditions). It includes criteria relative to well casing and cementing; blowout-preventer equipment; mud program; supervision, surveillance and training; and for the establishment of field drilling rules.

OCS Order No. 3. This order establishes plugging and abandonment procedures which have general application to all wells drilled for oil and gas. All casings, wellhead equipment, and pilings must be removed to a depth of at least 5 meters (16 feet) below the ocean floor unless another depth is approved by the Geological Survey District Supervisor.

OCS Order No. 4. This order sets out criteria for demonstrating the capability of a well to produce paying quantities of oil or gas.

OCS Order No. 5. This order contains detailed procedures for the installation, design, testing, operation and removal of subsurface safety devices.

OCS Order No. 6. This order sets specifications for workover procedures, including testing, and wellhead fitting, valves and casing heads. It relates to production operations only.

OCS Order No. 7. This order requires that the lessee prevent pollution of the ocean, prescribes certain pollution control measures, and prohibits disposal of any waste materials into the ocean that will create conditions which will adversely affect the public health, life,

property, aquatic life, wildlife, recreation, navigation, commercial fishing, or other uses of the ocean. Disposal of waste materials is regulated by the Environmental Protection Agency pursuant to the Clean Water Act.

OCS Order No. 8. This order establishes requirements applicable to platform and structure design and installation. It requires consideration of environmental conditions which may contribute to structure damage. This order applies to production operations.

OCS Order No. 9. This order for the Pacific Area OCS provides approval procedures for oil and gas pipelines on the OCS. All pipelines and related equipment must be designed and maintained with high-low pressure sensors, automatic shut-in valves, checkflow valves (to control backflow), and metering systems. The Order also requires adequate provisions for cathodic corrosion protection, trawling compatibility, hydrostatic testing, storm scour and other environmental stress in OCS pipelines. Procedures and schedules for regular inspection of pipelines along with recording of such inspections are stipulated.

OCS Order No. 10. This order provides for drilling twin core holes located adjacent to core holes drilled on the OCS under earlier California State authorization. Such holes were drilled prior to the establishment of Federal authority beyond the 3-mile limit.

OCS Order No. 11. This order sets requirements for maximum efficient recovery rate for oil and gas from a lease, and establishes production rates. It also provides procedures to shut-in wells, due to over-production or storms, and for producibility tests. It applies to production only.

OCS Order No. 12. This order sets forth requirements for public inspection of records. It details what information which the lessee provides to the U.S. Geological Survey is considered public and how this information should be transmitted to the Survey in order for it to be made publically available.

6. Standard Lease Stipulations: To mitigate known impacts that have become apparent during environmental analysis, stipulations that have been developed during past Sales are recommended so that those potential impacts can be reduced or eliminated. The following stipulations to the lease are planned.

a. Biological Stipulation

(To apply to all leases resulting from this lease sale.)

- (a) If the Deputy Conservation Manager has reason to believe that biological populations or habitats exist and require protection, he shall give the lessee written notice that the lessor is invoking the provisions of this stipulation and the lessee shall comply with the following requirements. Prior to any drilling activity or the construction or placement of any structure for exploration or development on lease areas including, but not limited to, well drilling and pipeline and platform placement, hereinafter referred to as "operation," the lessee shall conduct site specific surveys as approved by the Deputy Conservation Manager and in accordance with prescribed biological survey requirements to determine the existence of any special biological resource including, but not limited to:

- (1) Very unusual, rare, or uncommon ecosystems or ecotones.
- (2) A species of limited regional distribution that may be adversely affected by any lease operations.

If the results of such surveys suggest the existence of a special biological resource that may be adversely affected by any lease operation, the lessee shall: 1) relocate the site of such operation so as not to adversely affect the resources identified; 2) establish to the satisfaction of the Deputy Conservation Manager, on the basis of the site-specific survey, either that such operation will not have a significant adverse effect upon the resource identified or that a special biological resource does not exist. The Deputy Conservation Manager will review all data submitted and determine, in writing, whether a special biological resource exists or may be significantly affected by lessee's operations. The lessee may take no action until the Deputy Conservation Manager has given the lessee written directions on how to proceed.

- (b) The lessee agrees that if any area of biological significance should be discovered during the conduct of any operations on the leased area, he shall report immediately such findings to the Deputy Conservation Manager, and make every reasonable effort to preserve and protect the biological resource from damage until the Deputy Conservation Manager has given the

lessee directions with respect to its protection.

Evaluation of Effectiveness: The biological stipulation was designed to allow leasing activities to occur while providing protection to biological habitats. This stipulation was developed, in coordination with the Fish and Wildlife Service, and requires that the lessees conduct environmental surveys. Requiring site surveys provides for identification of specific areas which must be avoided in locating bottom-founded equipment and facilities. By imposing the biological stipulation, the unique organisms and habitats in these areas are adequately protected, while allowing the lessee to locate uninhabited areas for the placement of drilling structures which are compatible to the area. Therefore, the adverse impacts identified throughout the pre-lease process for this issue are believed to be adequately mitigated.

b. Cultural Resource Stipulation

(To apply to all leases resulting from this lease sale.)

If the Deputy Conservation Manager, having reason to believe that a site, structure or object of historical or archaeological significance, hereinafter referred to as a "cultural resource," may exist in the lease area, gives the lessee written notice that the lessor is invoking the provisions of this stipulation, the lessee shall upon receipt of such notice comply with the following requirements:

Prior to any drilling activity or the construction or placement of any structure for exploration or development on the lease, including but not limited to, well drilling and pipeline and platform placement, hereinafter in this stipulation referred to as "operation," the lessee shall conduct remote sensing surveys to determine the potential existence of any cultural resource that may be affected by such operations. All data produced by such remote sensing surveys as well as other pertinent natural and cultural environmental data shall be examined by a qualified marine survey archaeologist to determine if indications are present suggesting the existence of a cultural resource that may be adversely affected by any lease operation. A report of this survey and assessment prepared by the marine survey archaeologist shall be submitted by the lessee to the Deputy Conservation Manager and the Manager, Bureau of Land Management (BLM), Outer Continental Shelf (OCS) Office for review.

If such cultural resource indicators are present the lessee shall
1) locate the site of such operation so as not to adversely affect the identified location; or 2) establish, to the satisfaction of the Deputy Conservation Manager, on the basis of further archaeological investigation conducted by a qualified marine survey archaeologist or underwater archaeologist using such survey equipment and techniques as deemed necessary by the Deputy Conservation Manager, either that such

operation shall not adversely affect the location identified or that the potential cultural resource suggested by the occurrence of the indicators does not exist.

A report of this investigation prepared by the marine survey archaeologist or underwater archaeologist shall be submitted to the Deputy Conservation Manager and the Manager, BLM OCS Office for their review. Should the Deputy Conservation Manager determine that the existence of a cultural resource which may be adversely affected by such operation is sufficiently established to warrant protection, the lessee shall take no action that may result in an adverse effect on such cultural resource until the Deputy Conservation Manager has given directions as to its preservation.

The lessee agrees that if any site, structure, or object of historical or archaeological significance should be discovered during the conduct of any operations on the leased are, he shall report immediately such findings to the Deputy Conservation Manager and make every reasonable effort to preserve and protect the cultural resource from damage until the Deputy Conservation Manager has given directions as to its preservation.

Evaluation of Effectiveness: BLM has engaged in studies to evaluate the potential of cultural resources in the central and northern California OCS area. The lessee or agent, during any activities on the leasehold, is required to report any findings to the Deputy Conservation Manager in the event any site or object of historic or archaeological significance should be discovered. The contractor is also required to make every reasonable effort to preserve and protect such site or object from damage until the Deputy Conservation Manager makes a determination on its preservation. Through the imposition of this stipulation and compliance with applicable Federal and State laws regarding cultural resources, and adherence with the rules, regulations, and policies of the California Coastal Management Program and the Intergovernmental Planning Program for OCS Oil and Gas Leasing, Transportation, and Related Facilities, the protection and preservation of cultural resources is assured.

c. Geological Stipulations

The following tracts have been identified by the United States Geological Survey as hazardous due to their location on sea floor areas subject to mass movement.

Mass Movement Tracts: 001, 002, 003, 004, 005, 006, 007, 008, 009, 010, 011, 012, 014, 015, 016, 019, 020, 021, 024, 037, 038, 041, 043, 045, 049, 156, 157, 158, 159, 162, 163, 164, 165

These tracts will be subject to the following stipulations:

Exploratory drilling operations, emplacement of structures (platforms) or seafloor wellheads for production or storage of oil or gas, and the emplacement of pipelines will not be allowed within the potentially unstable portion of a lease block unless or until the lessee has demonstrated to the Deputy Conservation Manager's satisfaction that mass movement of sediments is unlikely or that exploratory drilling operations, structures (platforms), casing, wellheads and pipelines can be safely designed to protect the environment in case such mass movement occurs at the proposed location. This may necessitate that all exploration for and development of oil or gas be performed from locations outside of the area of unstable sediments, either within or outside of this lease block.

If exploratory drilling operations are allowed, site-specific surveys shall be conducted to determine the potential for unstable bottom conditions. If emplacement of structures (platforms) or seafloor wellheads for production or storage of oil or gas are allowed, all such unstable areas must be mapped. The Deputy Conservation Manager may also require soil testing before exploration and production operations are allowed.

The following tracts have been identified by the United States Geological Survey as hazardous due to the presence of submarine canyons or channels on all or portions of the tracts.

Submarine Canyons or Channels Tracts: 114, 128, 226, 227, 228, 231, 232, 233, 235, 236, 237, 239

These tracts will be subject to the following stipulation:

Exploratory drilling operations, emplacement of structures (platforms) or seafloor wellheads for production or storage of oil or gas or emplacement of pipelines will not be allowed within the potentially unstable portions of this lease block unless or until the lessee has demonstrated to the Deputy Conservation Manager's satisfaction that exploratory drilling operations, structures (platforms), casing, wellheads and pipelines can be safely designed to protect the environment at the proposed location. This may necessitate that all exploration for and development of oil or gas be performed from locations outside of the area of submarine canyons or channels, either within or outside of this lease block.

If exploratory drilling operations are allowed, site specific surveys shall be conducted to determine the potential for unstable bottom conditions. If emplacement of structures (platforms) or seafloor wellheads for production or storage of oil or gas are allowed, all such unstable areas must be mapped.

The following tracts have been identified by the United States Geological Survey as tracts that include a portion of, or are

immediately adjacent to, a major active fault zone.

Active Faults Tracts:

033, 048, 131, 138, 142, 143, 146, 147, 150, 151, 155, 161, 168, 175, 182, 189, 196, 203, 209, 210, 217

These tracts will be subject to the following stipulations:

Exploratory drilling operations, emplacement of structures (platforms) or seafloor wellheads for production or storage of oil or gas and the emplacement of pipelines will not be allowed in the vicinity of the fault until the lessee has demonstrated to the Deputy Conservation Manager's satisfaction that exploratory drilling operations, structures (platforms), casing, wellheads and pipelines can be safely designed to protect the environment in case fault movement occurs at the proposed location. This may necessitate that all exploration for and development of oil or gas be performed from locations outside of the area of potential fault movement, either within or outside of this lease block.

If exploratory drilling operations are allowed, site-specific surveys shall be conducted to determine the potential for active faulting. If emplacement of structures (platforms) or seafloor wellheads for production or storage of oil or gas are allowed, all fault zones must be mapped. The Deputy Conservation Manager may also require soil testing before exploration and production operations are allowed.

Evaluation of Effectiveness: The geological stipulations were developed in consultation with the U.S. Geological Survey. The stipulations require that exploratory drilling operations, emplacement of structures (platforms) or seafloor wellheads for production or storage of oil or gas, and the placement of pipelines be safely designed to protect the environment in case mass movement, unstable areas associated with submarine canyons or channels, or fault movement occur either within or outside of the particular lease block. Mapping is required if emplacement of structures (platforms) or seafloor wellheads for production or storage of oil or gas are allowed in all such unstable areas. Consequently, it is believed that all potential geological hazards are adequately mitigated.

d. Military Stipulation No. 1

(To apply to leases designated)

This stipulation applies to those tracts located in military operating areas. The tracts affected are listed with the appropriate military geographical area coordinator.

Tracts 129 through 243: Commander, Western Space and Missile Center (WSMC) and the Commander, Pacific Missile Test Center (PMTTC), or other

appropriate military agency.

Tracts 63, 65 through 70, 73, 74, 77, 78, 79, 82, 83, 96, 100, 104, 105, 108, 109, 114, 115, 116 and 119: Commander, Fleet Area Control and Surveillance Facility (FACSFAC), or other appropriate military agency.

- a) The lessee agrees that prior to operating or causing to be operated on its behalf boat or aircraft traffic into individual, designated warning areas, the lessee shall coordinate and comply with instructions from the Commander, Western Space and Missile Center (WSMC); the Commander, Pacific Missile Test Center (PMTC); and the Commander, Fleet Area Control and Surveillance Facility (FACSFAC), or other appropriate military agency. Such coordination and instruction will provide for positive control of boats and aircraft operating in the warning areas at all times.
- b) The lessee, recognizing that mineral exploration and exploitation and recovery operations of the leased areas of submerged lands can impede tactical military operations, hereby recognizes and agrees that the United States reserves and has the right to temporarily suspend operations of the lessee under this lease in the interests of national security requirements. Such temporary suspension of operations, including the evacuation of personnel, and appropriate sheltering of personnel not evacuated (an appropriate shelter shall mean the protection of all lessee personnel for the entire duration of any Department of Defense activity from flying or falling objects or substances), will come into effect upon the order of the Deputy Conservation Manager, after consultation with the Commander, Western Space and Missile Center (WSMC); the Commander, Pacific Missile Test Center (PMTC); and the Commander, Fleet Area Control and Surveillance Facility (FACSFAC), or other appropriate military agency, or higher authority, when national security interests necessitate such action. It is understood that any temporary suspension of operations for national security may not exceed seventy-two hours; however, any such suspension may be extended by order of the Deputy Conservation Manager. During such periods equipment may remain in place.
- c) The lessee agrees to control his own electromagnetic emissions and those of his agents, employees, invitees, independent contractors or subcontractors emanating from individual, designated defense warning areas in accordance with requirements specified by the Commander, Western Space and Missile Center (WSMC); the Commander, Pacific Missile Test Center (PMTC); and the Commander, Fleet Area Control and Surveillance Facility (FACSFAC), or other appropriate military agency, to the degree necessary to prevent damage to, or

unacceptable interference with, Department of Defense flight, testing or operational activities conducted within individual, designated warning areas. Necessary monitoring, control, and coordination with the lessee, his agents, employees, invitees, independent contractors or subcontractors, will be effected by the Commander of the appropriate onshore military installation conducting operations in the particular warning area: provided, however, that control of such electromagnetic emissions shall permit at least one continuous channel of communication between a lessee, its agents, employees, invitees, independent contractors or subcontractors and onshore facilities.

e. Military Stipulation No. 2

(To apply to all leases resulting from this lease sale.)

In order to indemnify and save harmless the United States, this stipulation will apply to the following tracts: 63, 65 through 70, 73, 74, 77, 78, 79, 82, 83, 96, 100, 104, 105, 108, 109, 114, 115, 116, 119, and 129 through 243.

Whether or not compensation for such damage or injury might be due under a theory of strict or absolute liability or otherwise, the lessee assumes all risks of damage or injury to persons or property, which occurs in, on, or above the Outer Continental Shelf, to any person or persons or to any property of any person or persons who are agents, employees or invitees of the lessee, its agents, independent contractors or subcontractors doing business with the lessee in connection with any activities being performed by the lessee in, on, or above the Outer Continental Shelf, if such injury or damage to such person or property occurs by reason of the activities of any agency of the U.S. Government, its contractors, or subcontractors, or any of their officers, agents or employees, being conducted as a part of, or in connection with, the programs and activities of the Western Space and Missile Center (WSMC), the Pacific Missile Test Center (PMTTC), or other appropriate military agency.

Notwithstanding any limitations of the lessee's liability in section 14 of the lease, the lessee assumes the risk whether such injury or damage is caused in whole or in part by any act or omission, regardless of negligence or fault, of the United States, its contractors or subcontractors, or any of their officers, agents, or employees. The lessee further agrees to indemnify and save harmless the United States against all claims for loss, damage, or injury sustained by the lessee, and to indemnify and save harmless the United States against all claims for loss, damage, or injury sustained by the agents, employees, or invitees of the lessee, its agents or any independent contractors or subcontractors doing business with the lessee in connection with the programs and activities of the aforementioned military installations and

agencies, whether the same be caused in whole or in part by the negligence or fault of the United States, its contractors, or subcontractors, or any of their officers, agents, or employees and whether such claims might be sustained under theories of strict or absolute liability or otherwise.

Evaluation of Effectiveness: The two military stipulations were developed in consultation with the Department of Defense. These stipulations relating to electromagnetic interference, shelter/evacuation, and holding harmless would be included in Sale No. 53 leases as they have been in previous OCS sales. It is believed that these stipulations will adequately mitigate any potential Department of Defense conflicts in the central and northern California OCS area.

f. Transportation of Hydrocarbon Products Stipulation

(To apply to all leases resulting from this lease sale.)

- a) Pipelines will be required: 1) if pipeline rights-of-way can be determined and obtained; 2) if laying of such pipelines is technologically feasible and environmentally preferable; and 3) if, in the opinion of the lessor, pipelines can be laid without net social loss, taking into account any incremental costs of pipelines over alternative methods of transportation and any incremental benefits in the form of increased environmental protection or reduced multiple use conflicts. The lessor specifically reserves the right to require that any pipeline used for transporting production to shore be placed in certain designated management areas. In selecting the means of transportation, consideration will be given to any recommendation of the intergovernmental planning program for assessment and management of transportation of Outer Continental Shelf oil and gas with the participation of Federal, State, and local government and the industry.
- b) Following the completion of pipeline installation, no crude oil production will be transported by surface vessel from offshore productions sites, except in the case of emergency. Determinations as to emergency conditions and appropriate responses to these conditions will be made by the Deputy Conservation Manager.
- c) Where the three criteria set forth in the first sentence of this stipulation are not met and surface transportation must be employed, all vessels used for carrying hydrocarbons to shore from the leased area will conform with all standards established for such vessels, pursuant to the Port and Tanker Safety Act of 1978 (PL 95-474).

Evaluation of Effectiveness. The intent of this measure is to transport hydrocarbons by the safest and environmentally preferable method. The measure has been standard for most OCS lease sales. There was agreement to adopt this measure at the 2974 meeting held in Washington, D.C. on August 26, 1980.

g. Wells and Pipeline Stipulations

(To apply to all leases resulting from this lease sale.)

- (a) Wells. Subsea well heads and temporary abandonments, or suspended operations that leave protrusions above the sea floor, shall be protected, if feasible, in such a manner as to allow commercial trawl gear to pass over the structure without snagging or otherwise damaging the structure or the fishing gear. Latitude and longitude coordinates of these structures, along with water depths, shall be submitted to the Deputy Conservation Manager. The coordinates of such structures will be determined by the lessee utilizing state-of-the-art navigation systems with accuracy of at least +50 feet (15.25 meters) at 200 miles (322 kilometers).
- (b) Pipelines. All pipelines, unless buried, including gathering lines, shall have a smooth-surface design. In the event that an irregular pipe surface is unavoidable due to the need for valves, anodes or other structures, they shall be protected in such a manner as to allow trawl gear to pass over the object without snagging or otherwise damaging the structure or the fishing gear.

The following was considered in assessing the need for and adequacy of this stipulation for the proposed lease area:

Existing OCS Orders Nos. 1 and 3 require that all subsea objects hazardous to navigation or commercial fishing be marked by nav aids as directed by the U.S. Coast Guard. OCS Order No. 3 requires that all casing, wellheads, and pilings, when abandoned, must be removed to a minimum depth of 5 meters (16 ft.) below the ocean floor; and that temporary abandonments must be identified and marked, as directed by the Coast Guard, when a casing stub extends above the ocean floor.

U.S. Coast Guard regulations provide for marking and protection of subsea objects and the U.S. Coast Guard has proposed regulations, 30 CFR 147 (Federal Register, May 1, 1980), which will establish "safety zones" around OCS objects. Obstructions must be accurately reported and the location published in a public notice.

Rights-of-way are subject to environmental safety assurance through regulations requiring best available and safest technology and

regulatory and CZM consistency reviews (OCS Lands Act, Section 5(e)), as amended).

Evaluation of Effectiveness. Although the wording of this mitigating measure has become standard, other existing measures, as discussed above, may adequately preclude the need for a special stipulation. The paragraph in the stipulation concerning pipelines was considered to be more appropriate to the stipulation for transportation of hydrocarbon products. However, due to the value of fisheries in the area, this standard measure should be adopted. There was agreement to adopt this measure at the 2974 meeting held in Washington, D.C. on August 26, 1980.

7. Other Mitigating Actions

a. Contingency Plans: To implement the Clean Water Act, as amended, the President's Council on Environmental Quality developed the National Oil and Hazardous Substances Pollution Contingency Plan following specific legislative directions to include: 1) the duties and responsibilities of each Federal agency in coordination with State and local agencies; 2) a strike force of trained personnel available to provide the earliest possible notice of a discharge; 3) a system of surveillance to provide the earliest possible notice of a discharge; 4) a national center to coordinate the plan; and, 5) procedures and techniques for identifying, containing, and removing the discharge (or dispersing it if necessary).

The Clean Water Act establishes the Environmental Protection Agency and the Coast Guard as enforcing agencies. These agencies have the authority and the capacity to marshall the nation's capability to combat an oil spill.

As a standard part of any OCS sale, OCS Order No. 7 requires oil spill equipment to be at the site of any drilling or development operation and also requires all of the requirements listed above to be met. In addition, along the California Coast there are several existing oil spill cooperatives (Clean Bay in San Francisco Bay, Clean Seas at Santa Barbara, Southern California Petroleum Contingency Organization at Long Beach and Clean Coastal Water at Long Beach) along with the USCG Pacific Strike Force located in San Francisco. While too far away to provide immediate response for the proposed Sale No. 53 tracts, they represent a significant source of trained personnel, equipment, and expertise similar to what will be required before development will be allowed to proceed on Sale No. 53 tracts.

b. Oil Spill Fund: Title III of the OCS Lands Act, as amended, establishes in the U.S. Treasury an Offshore Oil Pollution Compensation Fund to be administered by the Secretary of the Treasury. This fund provides compensation for any person suffering direct or actual injury caused by the discharge of oil from an offshore facility or vessel. A fee of not more than 3¢ per barrel of oil produced on the OCS provides the monies for the fund. The fees collected may be modified or increased to maintain the fund at a level between \$100 and \$200 million.

Claims for economic loss that arise out of or directly resulting from oil pollution may generally be asserted against the fund by any claimant for removal costs, and by a U.S. claimant who owns or leases property so damaged or who utilizes a natural resource involved, for injury to or destruction of real or personal property, loss of use of real or personal property, and loss of use of natural resources. The President may assert claims for injury to or destruction of natural resources over which the Federal Government exercises sovereign rights or exclusive management authority, as may a State for natural resources owned or

managed by the State. Lost profits or impaired earning capacity may be claimed by a United States claimant who derives at least 25 percent of his earnings from activities using property or natural resources affected by oil pollution. Federal, State, and local governments may also assert claims for tax revenue lost due to injury to real or personal property.

Owners and operators of offshore facilities are held strictly liable for all loss attributable to oil pollution from their facilities. Except in cases of gross negligence, willful misconduct, or violation of safety regulations, liability is limited in the case of vessels to the greater of \$250,000 or \$300 per gross ton; for an offshore facility, liability is limited to the total cleanup and removal costs, and \$35 million in damages. Evidence of financial responsibility adequate to satisfy the maximum amount of liability must be provided.

Upon payment of compensation for economic loss compensable under Title III, the fund becomes subrogated to all rights, claims, and causes of action of the claimant.

c. Fishermen's Contingency Fund: Title IV of the OCS Lands Act, as amended, establishes a Fishermen's Contingency Fund in the U.S. Treasury. The purpose of this fund is to compensate U.S. commercial fishermen (including operators of commercial passenger carrying fishing vessels) for damages caused by materials, equipment, tools, containers or other items associated with oil and gas exploration, development and production when no financially responsible party can be identified. Damages covered by the fund include: 1) loss of profits for the owner, operator and crew; 2) damage to, or loss of, fishing gear and vessels; 3) fuel costs; and 4) reasonable attorneys' fees (unless the claim is denied). The Fund does not compensate for personal injury resulting from damaged fishing gear since remedies are available under admiralty law.

A claim is presumed to be caused by items associated with OCS oil and gas exploration, development, or production activities if it is filed orally or on writing within five (5) days after the date when the damage or loss is discovered, and provides the preliminary information required by the regulations. A more detailed report must then be filed no later than sixty (60) days after the date the damage or loss is discovered. However: 1) the damage must have occurred in an area affected by OCS oil and gas exploration, development, or production activities as defined in the regulations; 2) the amount of the award will be reduced to the extent that the damage was caused by the negligence or fault of the commercial fishermen making the claim; 3) the claim will be reduced by the amount of compensation recoverable from insurance; 4) the damage or loss cannot be known to be caused by a natural obstruction or an obstruction unrelated to OCS oil and gas exploration, development, or production activities; 5) there must not be a record on the most recent nautical charts issued by the National Ocean Survey, NOAA, or in any

weekly Notice to Mariners issued by the Defense Mapping Agency Hydrographic/Topographic Center on or before the date of the damage that an obstruction existed in the immediate vicinity where the damage or loss occurred; 6) there must not be a proper surface marker or lighted buoy attached, or closely anchored to the obstruction. When damage occurs within a one-quarter mile radius of obstructions recorded on charts or in a Notice to Mariners, or are properly marked, it is presumed to involve the recorded obstruction and negligence or fault of the claimant is presumed unless the claimant can prove otherwise.

If a commercial fisherman does not file a claim within five (5) days, he may still receive compensation. However, the claim must be filed within 60 days after the date when the damage or loss is discovered and the claimant has the burden of proof to establish: 1) the identity or nature of the item which caused the damage; and 2) that the item which caused the damage is associated with oil and gas exploration, development, or production activities on the Outer Continental Shelf.

The Fund is divided into area accounts. California is included in the Pacific area account. Each area account cannot exceed \$100,000, but, if depleted, it will be replenished. The total amount in the fund cannot exceed \$1 million. Money for each area comes from holders of leases, exploration permits, easements, or right-of-ways for the construction of pipelines. The Secretary of Commerce specifies the amount to be paid but it may not exceed \$5,000 per lease, permit, easement or right-of-way in any calendar year; the Secretary of the Interior collects the money. Final regulations developed by the National Marine Fisheries Service for implementing the Fisherman's Contingency Fund are described in 50 CFR Part 296 (see the Federal Register Vol. 45, No. 17, pages 6062-6078, January 24, 1980, and Vol. 45, No. 129, pages 44942-44951, July 2, 1980).

Furthermore, to comply with the OCS Lands Act, as amended, National Ocean Survey (Department of Commerce) is conducting a survey of natural and manmade obstructions on the OCS that pose potential hazards to commercial fishing or fishing gear. Charts identifying these hazards will be developed for commercial fishermen. Initially, this survey shall concentrate on areas where OCS oil and gas production has or will soon commence.

d. Oil Spill Prevention and Mitigation: The prevention and mitigation of oil spills has historically been a prime consideration in OCS resource management. Prevention and mitigation measures are identified and required by the OCS Orders implemented by the U.S. Geological Survey as a standard part of any OCS lease sale. OCS Orders Nos. 2, 5, 7, and 8 specifically provide for the mitigation of oil spills through provisions for safety systems, pollution control equipment, personnel training and platform integrity verifications. These are reflected in that industry has drilled over 16,000 offshore wells since 1956 with an impressive safety record. Last year, only 2

oil spills of more than 50 bbl occurred within U.S. OCS waters, with the larger one involving 135 bbl of oil.

e. Oil Spill Modeling: An oil spill risk analysis model has been developed and utilized which quantitatively determines the likelihood of oil spill impact on particular areas and/or resource categories. The model results are discussed in Section IV.A.1 and the impacts are discussed in each section as appropriate within Section IV.B.

f. Prevention of Groundwater Contamination: The isolation of freshwater strata from potential contaminants in a borehole is insured by well casing, cementing and plugging regulations set forth in the Code of Federal Regulations (30 CFR Part 250.41) and OCS Orders No. 2 and 3. These regulations set forth the procedures to be undertaken during drilling and abandonment of OCS wells in order to ensure the isolation of oil, gas, and freshwater zones in the strata in which they are found, and prevent them from escaping into other strata or to the surface.

These measures should effectively maintain the purity of any freshwater aquifers which might be drilled through during OCS exploration and development activities.

In addition, Coastal Energy Impact Program (CEIP) formula grants can pay for costs of planning and development of new or improved public services and facilities (including water supply). CEIP is discussed in Section I.B.3.b and the regulations are detailed in the Code of Federal Regulations (15 CFR 931). Environmental and Recreation Loss Grants may be awarded to help prevent, reduce, or ameliorate unavoidable losses to environmental resources (including water quality) from OCS exploration or production (e.g., paying for a freshwater siphon to reduce damage to a freshwater source by salt water intrusion resulting from coastal energy activity). CEIP Planning Grants assist local governments to plan environmental consequences of coastal dependent energy activities affecting the coastal zone, and Credit Assistance is available to finance new or improved facilities in communities experiencing unplanned and unbudgeted demands upon their public services and facilities from coastal energy activity.

g. Exploration and Development Plans: The OCS Lands Act Amendments of 1978 placed additional requirements on lessees relative to Exploration and Development Plans. This section will note particular aspects of these Plans as they relate to exploration and development activities in the Sale No. 53 area.

The holder of an OCS oil and gas lease is required to submit an exploration plan to the Secretary of Interior (or his designate) prior to commencing exploration. The Exploration Plan is required to include: 1) a schedule of anticipated exploration activities; 2) a description of

the equipment which will be used; 3) the general location of each well that is to be drilled; and 4) any other information deemed pertinent by the Secretary.

The Secretary of Interior is required to disapprove any plan which would result in any condition which "...would probably cause serious harm or damage to life (including fish and other aquatic life), to property, to any mineral (in areas leased or not leased), to the national security or defense, or to the marine, coastal, or human environment"

[Sec. 5(a)(2)(A)(i)] if the proposed activity cannot be modified to avoid these conditions.

Additionally, approval will not be given to a plan if the exploratory activity would affect "...any land use or water use in the coastal zone of a State with a coastal zone management program approved pursuant to Section 306 of the Coastal Zone Management Act of 1972 (16 U.S.C. 1455)..." unless and until the prescribed consistency provisions of the CZM Act have occurred.

A plan is also required prior to development and production on any lease within the Pacific OCS region. Such a plan must be similarly approved by the Secretary of Interior. The plan is required to set forth:

1) the specific work to be performed; 2) a description of all facilities which will be constructed or utilized, including their location and size; 3) all environmental safeguards and safety standards, and how such are to be implemented and met; 4) an expected rate of development and production; and 5) any other relevant information which regulations may require [Sec. 25(c)]. The development and production plan is also required to meet those provisions of the Coastal Zone Management Act noted above.

Additionally, the Secretary of Interior is required to find that a development and production plan in a frontier area (such as would be the case for the Central and Northern California OCS) is, at least once, a major Federal action requiring the preparation of an environmental impact statement, with all the attendant procedures of the National Environmental Policy Act of 1969. Other development and production plans must allow 60 days for comments and recommendations from the Governor and/or the Executives of any affected local governments. In addition, any interested person may submit comments and recommendations.

h. Structural Verification Program: A program is currently being established by the U.S. Geological Survey, which is designed to assure that offshore oil and gas structures are designed, constructed and installed using standardized procedures to prevent structural failures. Lessees will be required to submit detailed information on any proposed structure to be erected. The program will facilitate review of these structures. The program will utilize third party expertise and technical input in the verification process through the use of a Certified Verification Agent. The program is described in detail in the Federal Register of July 2, 1979 (Vol. 44, No. 128).

One consideration particularly important to the California OCS will be meeting structural design criteria for seismic events. Design is performed for two levels of a seismic incident - an operational level and a safety level. Design for an operational event is safety that the structure suffers no damage. At the safety level, damage to and deformation of the structure may occur but there will not be collapse.

Determination of the acceleration forces to which the structure may be subjected is made by calculating the magnitude of the maximum probable and maximum credible earthquake likely to be generated by faults in the vicinity of the structure.

Bedrock acceleration at the site of the structure is related to the magnitude of an earthquake and its distance from the location. Bedrock acceleration is affected by the character of the overlying soils. In most instances, the overlying soils tend to reduce the forces of acceleration applied to the structure but in rare cases can amplify it. Once the seismic forces to which a structure may be subjected have been established, the structure is designed to withstand those forces.

Seismic activity has less of an effect on pipelines that are free to move. An unconfined pipeline has sufficient flexibility and elasticity that nominal seismic movement may have little effect on the integrity of the pipeline. However, if the pipeline is buried, the inherent flexibility and elasticity of the pipeline may be reduced to a point that damage is incurred.

Pipelines that cross potentially active faults that reach the surface require special consideration. Geophysical examination of the shallow portion of a fault trace may provide information on the date of the latest movement of the fault. In the absence of proof of recent activity at the tract of a fault, potential damage to the pipeline may be eliminated or minimized by crossing the fault tract in such a manner that the flexibility and elasticity of the pipeline are maximized.

i. Notices to Lessees and Operators: These notices have the same effect or status as OCS Orders and Regulations and are used when expeditious clarifications, corrections, or additions to the orders and regulations are necessary. By issuing Notices to Lessees and

Operators (NTL's), the extensive amount of time necessary to amend and republish orders and regulations is avoided. The NTL's effective as of March 1, 1977, except for NTL 78-1 which was effective as of October 23, 1978, are:

- NTL 77-1 - "Applications for Exploratory Operations"
- NTL 77-2 - "Minimum Requirements for Shallow Drilling Hazards"
- NTL 77-3 - "Minimum Cultural Resource Survey Requirements"
- NTL 78-1 - "Minimum Requirements for Biological Surveys"

The purpose of these notices is to keep lessees and operators informed as to what the USGS requires prior to approving proposals to conduct exploratory drilling operations. The text of Notices to Lessees and Operators which are currently in effect for the Pacific OCS area are on file with U.S. Geological Survey, Conservation Division, Los Angeles, California.

j. Aircraft Overflight Restrictions: Aircraft are presently restricted by existing State and Federal regulations from flying at altitudes below 1,000 feet near important pinniped and seabird terrestrial habitats on the Channel Islands, Ano Nuevo and Farallon Islands. Additionally, potential lessees will be notified in the proposed notice of sale by the Instructions to Lessees to avoid flying at altitudes less than 1,000 feet near all seabird nesting and pinniped rookery areas of central and northern California. The existing restrictions should protect the majority of California seabird and marine mammals from aerial harassment. The additional restrictions will provide additional protection to marine mammals and seabirds.

8. Interrelationship of Proposal with Other Projects and Proposals

a. California Coastal Management Program (CCMP) - CCMP, developed under the CZMA (see Section I.B.3.b), is a combination of State and local planning and regulatory authorities for controlling the uses of land, air, and water resources along the coast. The CCMP consists of two segments: The Management Program for San Francisco Bay, approved in February 1977; and the 1976 Coastal Act, approved in November 1977. Two agencies have responsibility for the implementation of the CCMP: the San Francisco Bay Conservation and Development Commission, with jurisdiction over San Francisco Bay and adjoining San Pedro and Suisun Bays; and, the California Coastal Commission (CCC) with jurisdiction over all of the remainder of the coastal zone. Any action that directly affects either the San Francisco Bay or the main coastline must be consistent to the maximum extent practicable with the CCMP. (For a discussion of the consistency of Federal actions that directly affect a State's coastal zone, see Section I.B.3.b.

The policies of the CCMP deal with the following concerns: Public Access, Recreation, Marine Environment, Land Resources, Development, and Industrial Development. The policies recognize that the coastline is a valuable resource that must have comprehensive planning to insure its long-range conservation, utilization, and orderly development. The planning and management policies of the CCMP will be implemented at the local level by the development and implementation of Local Coastal Programs (LCP) by all cities and counties wholly or partially within the coastal zone. The LCP's will include a land use plan, maps, and zoning ordinances which will implement the CCMP at the local level. The LCP's must be reviewed and certified by the CCC. Once an LCP has been certified, the local jurisdictions will then be responsible for issuing coastal development permits. By January 1981, all local governments within the 68 coastal jurisdictions (14 counties and 54 cities) must have prepared (or have had prepared by the California Coastal Commission) a local coastal program.

As required by the Coastal Zone Management Act, each State's management program must include a planning process for energy facilities likely to be located in, or which may significantly affect, the coastal zone, but not limited to, a process for anticipating and managing the impacts from such facilities [Section 305(b)(8)].

Article 7 of California's Coastal Act deals with Industrial Development Planning and Management policies. Sections 30260-30263 address coastal-dependent industrial facility siting and policies relating specifically to oil and gas development. The energy facility planning process is developed and implemented through the LCP process. The local jurisdictions identify possible energy facility issues to be addressed in their LCP's. This involves consultation and coordination with energy suppliers that may be interested in locating within the jurisdiction, so

that zoning and ordinances will be appropriate to the needs of all parties.

CEIP funds are presently being utilized in many counties for evaluating and recommending possible energy facility sites within their jurisdictions. The following discussion of the proposal's interrelationship with the LCP's is based on available LCP documents. The LCP process for Marin County's northern area and for Santa Cruz County were not at the document producing stage in July 1980. Humboldt County is presently completing a CEIP Industrial Siting Study that will examine siting alternatives for possible OCS related facilities. Mendocino has completed a CEIP "Development Scenarios and Siting Options" Study (March 1980). After examining four sites, the study is of the opinion that, given the inadequacies of the sites, it is more likely that the oil industry would want to locate its onshore facilities outside that county. However, onshore production of oil and gas may begin next year within Mendocino County at the site of the Manchester Anticline Petroleum Project. Consolidation of energy facility sitings could dictate that any OCS related facilities be sited there providing that impacts to the environment can be mitigated.

Sonoma County's LCP recognizes that Bodega Bay is a possible site for an onshore OCS related facility, but also points out the following: housing demands from OCS activities could not be met in Bodega Bay; adverse traffic and road impacts on the community may be significant during the exploration and development stages; present development within Bodega Bay is constrained by lack of road capacity, water supply, and by sensitive and hazardous lands; and the Bay is presently the home of a major commercial fishing fleet that would have to compete with OCS related ships for docking facilities. The LCP does not contain land use recommendations that encourage industrial or energy development in the coastal zone.

Marin County's Southern LCP prohibits all industrial and energy facility sitings because of the unique natural resources and recreational opportunities of the coastal area. San Francisco County is essentially fully developed in the coastal zone. San Mateo County's LCP anticipates very few onshore facilities, due to the county's close proximity to San Francisco Bay Area facilities. The county is presently working on a CEIP funded energy facility siting study that should be completed by September 1980. San Luis Obispo County is presently working on a CEIP funded energy facility siting and comparative siting analysis relative to possible support bases. Santa Barbara County's Land Use Plan sees no need to expand present energy facilities within the county, as many are presently running under capacity.

In general, local jurisdictions favor consolidation of energy facility sitings, pipeline transportation of oil and gas, and mitigation of the adverse social, economic, and environmental effects of OCS development.

b. Marine Parks, Sanctuaries, and Oil and Gas Sanctuaries: Under the Marine Protection, Research, and Sanctuary Act of 1972 (16 U.S.C. 1431-1434), the Secretary of Commerce is empowered to designate areas as Federal marine sanctuaries for the purpose of preserving or restoring such areas for their conservation, recreation, ecological, or esthetic values, following consultation with the Secretaries of State, Defense, Interior, and Transportation, with the Administrator of EPA, and with other interested agencies. Once an area is designated a marine sanctuary, the National Oceanic and Atmospheric Administration Office of Coastal Zone Management is required to issue "necessary and reasonable regulations" for control of activities permitted within the marine sanctuary. Multiple uses (including oil and gas development) could be permitted within a marine sanctuary, providing these uses comply with the regulations governing the sanctuary.

There are additionally numerous coastal areas in central and northern California which have been designated as parks, sanctuaries, beaches, reserves or recreational areas by County, State, or Federal agencies (Figure I.B.8.b-1). There are also eight existing State maintained underwater parks between the Oregon border and Point Conception, with five additional ones proposed, and eleven sites under consideration. Further discussion on these underwater parks may be found in Section III.B.4.a. The California State Water Resources Control Board has also designated 20 "Areas of Special Biological Significance" in the region. The State has established two oil and gas sanctuaries in this region extending out to the 3-mile limit of the State's jurisdiction (Figure I.B.8.b-1). These are areas within State waters that are specifically excluded from oil and gas leasing through Chapter 1724 of the Statutes of 1955, the Cunningham-Shell Tideland Act. Administered by the State Lands Commission, these sanctuaries were established to give the State the authority to regulate oil and gas development in State waters, but do not contain any restrictions on the placement of pipelines from the OCS. The oil and gas sanctuary south of Monterey includes the California sea otter game refuge. Elkhorn Slough, located in Monterey Bay, will be a designated Federal estuarine sanctuary when the land acquisition phase is completed.

The most significant aspect of marine parks and sanctuaries, with respect to OCS oil and gas development, is the proposed designation of three marine sanctuaries by the Secretary of Commerce. The three sanctuary areas under consideration are: 1) Point Reyes/Farallon Islands, 2) Monterey Bay and adjacent waters, and 3) Northern Channel Islands and Santa Barbara Island.

The Point Reyes/Farallon Islands sanctuary was originally proposed by the Resources Agency of the State of California. Subsequent analysis led to the designation of this site as an active candidate for sanctuary status. The National Oceanic and Atmospheric Administration (NOAA) then prepared and released a DEIS on the site in March of 1980, and in doing

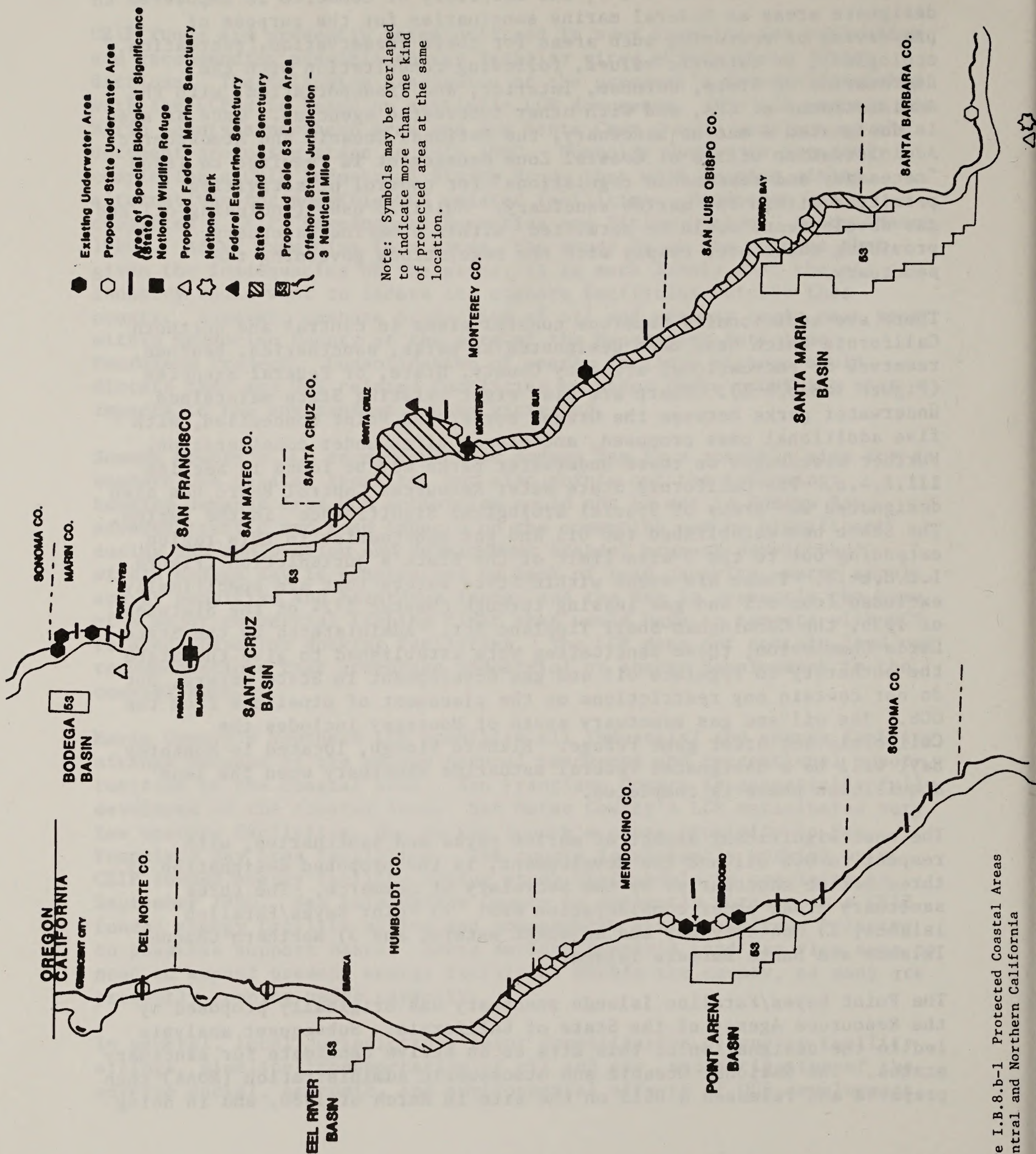


Figure I.B.8.b-1 Protected Coastal Areas of Central and Northern California

so, recommended the prohibition of future oil and gas development within the proposed sanctuary boundaries. This would include portions of tracts 069 and 073. Pipelines related to operations outside the sanctuary may, after sanctuary certification, be located within the sanctuary outside a 2-nmi buffer zone surrounding the Farallon Islands, Bolinas Lagoon, or any other area designated as an Area of Special Biological Significance by the State.

A similar process resulted in the designation of the Northern Channel Islands and Santa Barbara Island as an active candidate. NOAA released an FEIS on the area in March of 1980. Designation of this area may occur as early as the fall of 1980. Adoption of this proposal would exclude oil and gas operations within 6-nmi of the Northern Channel Islands and Santa Barbara Island. There are no tracts within the proposed Sale No. 53 lease area that extend into this proposed exclusion area.

A final schedule for the designation process for the proposed Monterey Bay Marine Sanctuary will be developed in the fall of 1980. The study area boundary currently includes all or part of tracts 107, 111, 112, 118, 122, 125, and 128 in the Santa Cruz Basin (see Section II.B.10.a). Specific regulations that would govern OCS oil and gas leases within the proposed sanctuary have not been developed at this time. These proposed regulations will be included in a DEIS issued by the Department of Commerce. Since the resources here are essentially similar to those found in the other active California marine sanctuary sites, activities subject to regulations may also be similar, and oil and gas development may therefore be prohibited in these areas.

c. Others: In addition to proposed OCS Sale No. 53, numerous other proposals and public and private projects will be ongoing at the same time in the central and northern California coastal area. A description of these projects and proposals and the development assumptions are included in Section III.B.3.b (Coastal Economy). These projects and proposals also provide the basis for the cumulative impact analysis of Section IV, Environmental Consequences of the Proposed Sale.

CHAPTER II

II. ALTERNATIVES INCLUDING THE PROPOSED ACTION

This section analyzes fifteen alternative actions, including the total sale offering as one of the alternatives (Section II.A). Section II.B highlights pertinent information regarding thirteen modifications to the proposed action. It is very important to note that any combination of these alternatives, or other alternatives not described, can be selected by the secretary if a sale is ultimately held. Section II.B.14 discusses some of the ways the secretary might recombine the various alternatives to the proposed action.

A. Hold the Sale as Proposed

1. Description of Resource Potential and Activities Estimated to Result from the Proposed Sale: The proposed Sale is described in Section I.B.2 (Description of the Proposal) and on Visual No. 1. The proposed Sale offering includes 242 tracts in 5 distinct subareas. Tracts range from 3 to 27 miles offshore, extending from waters opposite Humboldt Bay in northern California, to offshore waters opposite Point Conception in central California. The Sale would involve a total offering of 532,258 hectares (1,290,513 acres). The resource potential is discussed in Section I.B.2.b. The facilities, installations, and developmental assumptions are detailed in Section I.B.2.d, while the OCS operating orders, lease stipulations, and other mitigating actions are discussed in Sections I.B.5, 6, and 7, respectively.

2. Summary of Probable Impacts to the Environment: An in depth analysis of impacts can be found in Section IV. The following is a summary of major anticipated impacts upon air and water quality, marine and coastal ecosystems, endangered species, proposed marine sanctuaries, commercial fishing, recreation and sportfishing, land use, transportation systems, military use, archaeological and cultural resources, and visual resources.

a. Air Quality: Oil and gas exploration and development activities resulting from Sale No. 53 will result in increased emissions of various types of air pollutants. Hydrocarbons and nitrogen dioxide are expected to be emitted in the greatest quantities. Lesser quantities of SO₂, CO, particulates and hydrogen sulfide are also emitted. In the Sale No. 53 Air Quality Study (POCS Reference Paper No. 53-5), computer simulation models were used to convert Sale No. 53 related emissions into onshore pollutant concentrations. The model results show that, in general, Sale 53-related development will not significantly degrade onshore air quality. The increment of air quality deterioration considered significant by DOI could be marginally exceeded by Sale 53 development in several areas. These impacts would be mitigated by the cumulative impact provision of the existing DOI air quality regulations. All air

quality impacts would be further mitigated by implementation of more stringent air quality regulations for the California OCS.

Without further mitigation measures Sale 53-related development could cause onshore areas near the Santa Maria tracts to exceed the federal ozone standard (these areas currently meet the standard by a small margin). This impact would not be allowable under DOI regulations. The necessary additional mitigations would be provided using the cumulative impact provisions of the DOI air quality regulations.

b. Water Quality: Throughout oil and gas development and operation, water quality will be decreased by: resuspension of sediment through exploration and development activities and pipeline construction, discharge of sewage, formation water, drilling muds, and cuttings and hydrocarbon discharge through potential accidents and small chronic discharges.

Pipeline laying and drilling mud operations will have short-term impacts on water quality by causing increased turbidity from suspended bottom sediments. The degree to which turbidity will increase is dependent on current speed and duration, water depth, thermal stratification of water masses, sediment type and particle size and the method of digging the pipeline trench. Primary production by phytoplankton will be reduced due to decreased photosynthesis resulting from decreased light in turbid water. However, this impact will be insignificant given the expected, short period during which dredging will occur and the extent of sediment plumes. In the worst case (fine clay particles discharged from platforms as drilling mud) ambient turbidity levels should be obtained within approximately 1500 meters (Ayers, Meek, Shauer and Stuebner, 1980). Impacts on plankton are discussed in section IV.B.2.a.

Some concern has been focused on possible remobilization of pollutants in sediments back into the water column. Research by Young and Mearns (1978) indicated apparent mobilization of mercury and chlorinated hydrocarbons DDT and PCB and bio-magnification through the food web. Other heavy metals investigated by them did not show bio-magnification in structured food webs but did show accumulation over ambient sediment concentrations in the lower trophic levels of the web. Chen et al. (1974) and Grimwood, Dufrene and McGhee (1978) found no statistically significant relationship between sediment trace metal levels and water column concentrations. Discharges from OCS activities will therefore have some effect on trace metal concentrations in lower trophic level invertebrates but should have insignificant effects on the entire marine food web.

Sewage from platforms (see Table I.B.2.d-2) will have an insignificant impact given the dilution by ocean water, with the exception of water degradation in the immediate vicinity of the discharge. Surrounding the sewage discharge location, algae and bacterial growth are expected to be inhibited because of residual chlorine from disinfection of sewage as

required to meet EPA NPDES standards (minimum chlorine residual of 1.0 mg/l after 15 min retention).

Drilling mud and cuttings will have a local impact on water quality which is attenuated with increasing distance from the point of discharge (Ray and Meek, 1980; Ayers, Meek, Shauer, Stuebner, 1980; Shinn, Hudson, Robbin and Lee, 1980). Recent sub-lethal and long-term (longer than the traditional 96 hour acute toxicity bioassays) experiments on the effects of drilling muds or mud components in marine organisms have indicated both toxic and relatively non toxic effects which are discussed in section IV.B.1.b. Smothering of benthic organisms by cuttings and drilling muds is expected in the area immediately under and adjacent to drilling operations but the extent of this impact is dependent on currents and wave conditions. It is not expected to be a significant impact except in hard bottom benthic habitats where with time the hard bottom (rocky) characteristic of the bottom could be changed to a more soft bottom substrate.

Formation water discharged from platforms will degrade ambient water quality through the discharge of hydrocarbons and trace elements. The extent of water degradation will depend on several factors including current speed, rate of discharge of effluent, temperature differential between ambient ocean water and discharged formation water, discharge depth and temperature stratification of the water mass around the platform. These factors are considered in a formation water dispersion model developed for the BLM by Dr. Tom Dickey (1980) and results are discussed in section IV.B.1.b.

c. Marine and Coastal Ecosystems: The 2.29 large spills expected to occur from OCS Sale No. 53 could cause high ecological losses to sea otters and estuaries or wetlands if these habitats were hit with a spill. Based on the oil spill model, the probability of a hit on the sea otter area is 10 and 29 percent for 3 and 30 days, respectively, while the probability of oil reaching the mouths of important estuaries ranges from 6 to 20 percent within 30 days in the absence of cleanup equipment. The ability to contain or divert oil away from the openings will be effective 32 to 36 percent of the time.

Should oil contamination of sediment occur, localized reduction of subtidal benthic populations may occur, but the long-term overall adverse impacts on the subtidal community from oil spills will probably be low. Based on the oil spill model the area of highest localized impacts is the Santa Maria Basin. The most likely impact on the rocky intertidal habitat is predicted to be moderate and short term. On the sandy beach intertidal, the impacts are predicted to be low. However, impacts could be high in the Pismo clam area and for certain endemic species of the Nipomo Dunes resulting from careless cleanup operations. Species not expected to suffer high long term impacts from oil spills are cetaceans, pinnipeds, and birds (except at localized areas),

plankton, terrestrial plants and animals, and kelp plants. Small invertebrates associated with kelp beds may have high mortality with variable recovery periods, depending on the species. Note, though recovery is believed to be rapid for the majority of kelp canopy species which are associated with the area contacting oil for the longest period. Moderate impacts may occur on the year class of certain species which have temporary planktonic stages.

High ecological damage from normal development and operations is not expected for most biological resources. Possible exceptions to this are undiscovered benthic areas which could contain unique assemblages or species (such as the "fossil limpet" in Southern California) and certain hard bottom areas. Temporary impacts could be high on a hard bottom area at localized sites, permanent ecological loss to a particular assemblage or species could occur if the hard bottom were isolated or contained a rare or unusual assemblage. The magnitude of the impacts are defined in Section IV.B.2.

Examination of impacts without the oil spill model, giving each area an equal chance of a hit with a large oil spill, provides an analysis of possible impacts, especially for the more sensitive coastal resources. The major differences could occur in estuaries where oil could be diverted or contained 30 to 35% of the time in northern California and 35% to 50% of the time south of San Francisco. This is due to the frequency of waves five feet or greater. Tomales Bay, Drakes Esteros, Pajaro River and possible Humboldt Bay and San Francisco Bay may not be able to be protected from a spill heading toward the mouth because of the large size of the openings. Intertidal areas would also have higher probabilities of an oil spill hit because of wave height frequency. Many important, or unusual intertidal areas occur and most are discussed in the text. Rocky intertidal areas which are small, unique, and reproductively isolated may be lacking. The Trinidad Head and Diablo Canyon areas are isolated, but their relatively long horizontal extent (particularly Diablo Canyon) should favor near normal repopulation. A possible exception to this is a few species which are present in a few isolated areas.

Impacts caused by long-term chronic oil pollution remain uncertain.

d. Endangered Species: Due to the presumed low probability of spills associated with exploratory activity, major direct and indirect effects to endangered and whale species during exploratory phases of the proposed sale are not expected. Effects to disturbance may be sustained by some endangered whale species during development phases, but it is unknown whether such disturbance would lead to significant population responses of endangered whales. Effects of chronic pollution may also be sustained during production phases. Deletion of certain nearshore tracts in the proposed sale could possibly reduce adverse direct effects of disturbance and water pollution on gray

whales and the southern sea otter. Due to the present difficulty in assessing overall impacts of Federal and non-Federal energy projects and/or other factors which may affect endangered whales, cumulative impacts or the relative contribution of the proposed sale to such impacts cannot be predicted except to say that such effects are possible.

Due to the presumed low probability of spills associated with exploratory activity, exploration phases of the proposed sale are not expected to impact the American peregrine falcon, Southern Bald Eagle, California Brown Pelican, Californis least tern, salt marsh harvest mouse, the California clapper rail, the southern sea otter, the green sea turtle, or the leatherback sea turtle. On-going and future consultations regarding exploration, development, and production phases of the proposed sale and future lease sales (pursuant to requirements of the Endangered Species Act of 1973) may result in additional mitigation of adverse effects on endangered species as may be required.

e. Proposed Marine Sanctuaries: If the proposed Sale No. 53 were held it would not prevent the establishment of any of the proposed marine sanctuaries, or the maintenance of the existing estuarine sanctuary in its present condition. Any potential impacts to these sanctuaries would come, primarily, from oil spills. The probability of any of these areas being hit is very low, less than 4 percent in most cases. Anticipated impacts would not significantly alter the character of any of these areas.

Important cumulative impacts are primarily those associated with oil spills. The cumulative probabilities of an oil spill hitting the Gulf of the Farallons is 19 percent, 13 percent for the Islands themselves. Mainland portions of this proposed sanctuary (Point Reyes-Farallon Islands) have hit probabilities less than 4 percent. Within the Monterey area (Monterey Bay and Elkhorn Slough sanctuaries) cumulative oil spill hit probabilities range up to 29 percent within 30 days. For the proposed Channel Islands sanctuary, cumulative probabilities are as high as 41 percent for specific sections like Richardson Rock. Most areas have much lower probabilities. The cumulative impacts upon the three proposed sanctuaries and one existing sanctuary could result in an alteration of the character of these areas.

f. Commercial Fisheries: The greatest impacts on commercial fisheries probably would be from oil spills. Since most oil remains at the surface, species which occur in the surface layer are the most vulnerable to impacts from oil. There are too many variables to accurately predict these impacts, but low to moderate ecological losses could occur. Oil may also have a significant impact on salmon and other anadromous fishes that use chemical cues to return to their native streams to spawn. In the case of a large spill reaching an estuary,

such contamination could reduce the runs for a period of 5 years or more, resulting in high ecological losses. Salmon populations are already stressed from habitat degradation of their freshwater spawning streams and oil contamination of these streams would severely stress their populations. There also would be high ecological losses to other species if oil reaches an estuary. Reduction in the population size of one species may significantly affect other species in the food chain. The potential economic impacts of oil spills on commercial salmon fishermen during the entire life of the project are estimated to be: Eel River Basin \$0, Point Arena Basin \$113,000, Bodega Bay Basin \$61,000, Santa Cruz Basin \$585,000 and Santa Maria Basin \$292,000. (See Section IV.B.4 for detail.) Additional economic losses could be incurred by fishermen who fish for other species, and by support, processing, transportation and marketing industries. Mitigation is provided by OCS Order No. 7 which requires that each oil company develop oil spill contingency plans and have ready access to pollution-control equipment. The Offshore Oil Pollution Compensation Fund was created to compensate for these and other losses.

Conflicts between commercial fisheries and manmade structures can occur offshore and onshore. In central and northern California, the fisheries most likely to have significant conflicts with offshore structures are the trawl fisheries. The total fishing area that will be precluded by OCS structures is very small, and there probably will not even be a detectable loss in catch. Nevertheless, these structures will be a nuisance to fishermen. At the same time, surface structures can provide benefits as navigational aids, and emergency help in case a vessel is disabled or a crewman injured. Periodically, fishermen will snag a subsea obstruction either because they were intentionally fishing close to the structure to catch the fish attracted to it, or because they did not know the structure existed. The estimated losses per basin are: Eel River \$10,000, Point Arena \$60,000, Bodega Bay \$0 Santa Cruz \$30,000 and Santa Maria \$50,000. (See Section IV.B.4 for detail.) The Fishermen's Contingency Fund will not compensate for these losses if the locations of the obstructions have been published. Debris dropped overboard also will interfere with trawling. OCS Order No. 1 requires that any equipment that could be expected to interfere with commercial fishing gear be marked, wherever practicable, with the owner's identification so that fishermen can seek compensation from the appropriate party. If the responsible party cannot be determined, the Fishermen's Contingency Fund usually will compensate for the losses. However, applying for reimbursement from this fund places administrative burdens on the fishermen and compensation may not be received for several months. Offshore manmade structures also can cause disruption of critical habitats. If the Dover and Petrale sole spawning areas within the Eel River Basin are disrupted, the commercial fisheries for these species could be severely impacted. Also, it has been suggested that unburied pipelines could interfere with the seasonal migration of the Dungeness crab. If this is true, this could significantly impact the population and fishery.

Onshore competition between the oil and gas industry and commercial fishing can occur for berthing spaces and support services. Unless the commercial fishing industries' interests are carefully considered before a port is used by the oil and gas industry, significant impacts to the commercial fishing industry could occur.

Disposal of any waste material into the ocean that will create conditions which will adversely affect aquatic life or commercial fishing is prohibited by law, and is regulated by the Environmental Protection Agency. However, drilling muds could significantly affect fish and invertebrate populations and their fisheries, especially when there are important spawning areas within the lease tracts (e.g., the Dover and Petrale sole spawning grounds in the Eel River Basin) or when the fishery is limited and a significant part of that fishery occurs within the lease tracts (e.g., the spot prawn fishery in the Santa Maria Basin).

Increased vessel traffic will cause some conflicts between the oil and gas industry and commercial fishermen. Supply and crew boats probably will be the most frequently encountered, but the greatest conflicts probably will occur with seismic boats. Reimbursement for gear damage may be available from the Fishermen's Protection Act.

None of the mariculture industries are anticipated to be impacted by the proposed Sale No. 53, but if oil were to reach these industries, high economic impacts could occur. Mitigation and compensation for oil spills would be the same as for other fisheries (see discussion above). Potentially, platforms may be used for mariculture operations.

g. Recreation and Sportfishing: Recreation and tourism comprise a major segment of the economy of the coastal counties of the proposed sale area and, as such, are susceptible to economic impact from offshore development, in addition to the visual and aesthetic impacts. The most significant impact would be that of an oil spill impacting the shoreline, which could affect the economy and aesthetics of the area. This would tend to cause a closing of the impacted beach for the duration of the cleanup operations, which could cause a reduction in the recreational economy at the local level. Rapid mobilization of cleanup and containment teams would help reduce this impact.

Tourism over the total sale area will be relatively unaffected by the impact of a spill in one location, as was demonstrated by the Santa Barbara oil spill. However, many impacts would be noticed on a local level and since tourism ranks as the number two industry for almost the entire sale area, any reduction would have a significant impact on the local economies.

Generally, impacts of the proposal on recreation are expected to be minor due to mitigating measures and safety standards.

Oil spills will impact sportfishing if they occur or move into a sportfishing area since fishing would be temporarily discontinued until cleanup has been completed due to the possibility of gear and vessels being contaminated and fish tainted. Additionally, boats may be confined to port by oil containment booms. A major spill could have temporary economic impacts upon operators of passenger carrying fishing vessels who rely upon sportfishing activities for their living, and on local tourist industries that rely on their marine resources to attract visitors. The California Department of Fish and Game has identified tracts in the Point Arena Basin that are near important abalone harvesting areas (see the Sensitive Biological Areas alternative). A major spill could also affect sportfishing by impacting fish and invertebrate populations (see discussion under commercial fisheries). Declines in salmon and other anadromous fish populations probably will have the most significant impacts. Mitigation is provided by OCS Order No. 7 which requires that each oil company develop oil spill contingency plans and have ready access to pollution-control equipment. For large spills these measures will probably have minimal effectiveness since rough seas frequently occur in the proposed lease area. Formulation of new oil spill cooperatives in the future may further mitigate these impacts. The other OCS Orders are intended to reduce the likelihood of oil spills; however, these measures will not reduce the estimated losses noted above since these losses are based on the predicted number of oil spills over the life of the project. The Offshore Oil Pollution Compensation Fund was created to compensate for these and other losses (see Section I.B.7.b). Since this Fund is new, its effectiveness cannot be evaluated.

There is no doubt that production platforms act as artificial reefs. However, this may not benefit the sport fishermen since oil companies generally discourage them from anchoring or otherwise floating next to a platform. The total fishing area that will be precluded by OCS structures will be negligible. Other types of conflicts between sportfishing and manmade structures are not anticipated, but if they occur the Fishermen's Contingency Fund will compensate for most of the losses (see Section I.B.7.d).

On the positive side, the proposed lease sale will provide additional navigational aids and locations where emergency help can be obtained in case a vessel is disabled or a passenger injured.

Impacts from discharges, effluents and vessel traffic are expected to be similar to the impacts described for commercial fisheries (see Section IV.B.4).

h. Socio-Economics: Generally, socio-economic impacts are relatively minor in the central and northern California coastal area as a result of proposed Sale No. 53. This is the case under the most probable resource estimates, as well as the low and high resource estimates. The differing transportation scenarios do not cause any

significant changes in the level of socio-economic impacts. Socio-economic impacts would result from changes in the level and/or composition of population and jobs in the region. Generally, the impacts are positive, causing increases in employment and total production of goods and services in an area. The analysis indicates that there would be little in the way of infrastructure stresses that would result from the proposed Sale. Changes in absolute population and jobs are rather minor relative to the existing base. Projected changes in value added indicate that there will be little change to the existing economic base. State and local government income and expenditures change to only a very minor degree in the coastal counties. However, particular areas or localities could be impacted to a somewhat greater or lesser extent. The ultimate location of temporary and permanent onshore facilities will be the primary factor in causing local impacts.

The greatest socio-economic impacts are projected for the counties of Humboldt, Mendocino, San Luis Obispo, and Santa Barbara. While development of OCS areas may cause certain localized population/employment and infrastructure impacts at various times, the overall effect is expected to be rather moderate relative to the existing social and economic base throughout the region. Exploration and development plans developed during the process will delineate site-specific impact information. Local and regional zoning/planning requirements are expected to further minimize any dislocations that might result from the proposed Sale.

i. Land Use: Primary impacts on land use from the proposal will result from the demand for land for onshore facilities necessary for the exploration, development, production, and transportation phases of OCS oil and gas activity. In addition, there may be secondary land use impacts caused by the physical demands for land for the additional population: an increase in the housing demand, schools, recreation sites, transportation services, and city services. These secondary impacts could be critical at the local level where it is primarily rural and without such an infrastructure already in existence. There would also be space use conflicts over the other possible uses of the land. This would be especially severe in some port areas. The siting of OCS related facilities would also place a strain on the available water supplies in many areas.

j. Transportation Systems: The proposed lease sale could generate some increased direct employment in the shipping industry and other secondary employment. Increase in employment is relatively small when compared to total employment in the regional economy. However, for certain sectors, changes could be more significant. (Additional information on employment can be found in Section IV.B.6.a.)

The estimated number of vessel accidents during the proposed sale development and production could be small unless the proposed California-Oregon Border to Point Conception traffic separation scheme

is not established.

Traffic lanes crossing the Eel River and Santa Maria tracts could increase the cost of exploration and development substantially (see Navigation, Section IV.B.6.c).

k. Military Use: There are no anticipated impacts on military operations in any of the proposed sale areas, with the possible exception of Submarine Diving Area U5. This diving area covers tracts 096, 100, 104, 105, 108, 109, 114, 115, 116 and 119. Note, however, that the Department of Defense has agreed to joint operations in this area.

l. Archaeological and Cultural Resources: The shallower waters of the OCS, off central and northern California, have an excellent potential for prehistoric and historic cultural resources (see Cultural Resources Visual No. 8). Shipwrecks in the deep cool waters of the OCS are likely to have been well preserved and attempts should be made to protect these resources. This proposal will place large and relatively permanent sources of magnetic anomalies on the OCS during the life of the project. After abandonment, remaining piling and well casing below the mudline will create large, permanent magnetic anomalies. This will complicate or could preclude search for antiquities and modern objects (ships, aircraft, etc.) alike.

Physical disruption would occur if construction activities took place on undetected or ignored cultural resource sites. These types of impacts would arise from pipeline construction and burial and other construction such as operations bases. The severity of the impact would vary with the significance of the resource and the level of damage or disruption. State protective requirements probably would be mitigatory in most terrestrial areas. The presence of workers and supervisory staff in the area enhances the prospects for pot-hunting and vandalism. It is possible oil spills will impact Native American gathering sites. Spiritual and visual intrusion will occur in several areas.

Benefits will result from the proposed sale in the form of increased knowledge of cultural resources in central and northern California and possible identification of previously unknown resources.

m. Visual Resources: The visual impact of offshore facilities will have a relatively minor impact on the aesthetics of the area (see Figure IV.B.11-i) because of the size of the structures relative to their distance from shore. Onshore facilities can be sited in such a manner as to lessen the visual impact and thus are expected to have a minor impact on the aesthetics of the area.

B. Alternatives to the Proposed Action

This section discusses thirteen alternatives to the proposed action and explains the reasons the previously proposed air quality alternative is no longer necessary. Five total basin alternatives are discussed as well as six alternatives designed to reduce potential conflicts with sea otters, commercial fisheries, sensitive biological areas, marine sanctuaries and geological hazards. A No Sale and Delay the Sale alternative are presented and lastly, an Other alternatives section illustrates how the secretary could recombine these alternatives to create new ones.

1. Alternative to Modify the Sale by Deleting the Eel River Basin

a. Description: The Eel River area proposed for leasing consists of 30 tracts, numbers 001 through 030, totaling 66,301 hectares (163,765 acres). This represents 12.46 percent of the total proposed sale area. Estimated recoverable gas resources are 182 billion cubic feet (conditional mean estimate). The risked mean resource estimate is 71 billion cubic feet of gas, which is 11.4 percent of the total estimated gas resources within the proposed sale area. Presently, there are no estimates of recoverable oil resources. There are no previously leased tracts in this area.

Removal of all these tracts from the proposed sale would mean giving up, temporarily at least, the above estimated volumes of gas. Installations, effluents and their potential impacts, estimated to result from development of these leases, would be eliminated. The installations and effluents eliminated include: 11 exploratory wells (average depth 6,000 feet), 18 development wells (average depth 5,500 feet), 1 production platform and 1 subsea completion, 13 miles of pipeline, 40,008 bbl of drill cuttings, 18,760 bbl of mud and displacement of 49,938 cubic yards of sediment.

b. Impacts: Each of the resources described in Section III.A and B are of concern. Deletion of the entire basin would, of course, eliminate all potential OCS related conflicts with all other resources. The major areas of concern for the Eel River Basin are: 1) commercial fishing, 2) marine life (in general), 3) air quality, 4) geologic hazards, and 5) aesthetics. Table II.B.1.a-1 lists tracts which have been identified with specific environmental concerns or uses. Deletion of this basin from the sale would eliminate these potential impacts.

If Alternative 1 is selected, impacts resulting from Sale No. 53 will remain the same in the Eel River area with the exceptions discussed below. There will be no decrease in water and air quality, and there

will be no new marine habitats in the form of rigs. There will be no impacts on recreation or cultural resources. Commercial fishing losses will not occur. Geohazard concern for 19 tracts will be eliminated. This alternative will also eliminate the potential impacts of manmade structures, drill muds and cuttings on the important Petrale and Dover sole spawning grounds and on the benthic communities associated with hard rock outcrop located in this basin. Impacts on other commercial and sport fisheries in this basin will also be eliminated. For a detailed discussion of impacts see Sections IV.B and C.

TABLE II.B.1.a-1

POTENTIAL TRACT CONFLICTS IN EEL RIVER BASIN

<u>Resource</u>	<u>Tract(s)</u>	<u>Potential Conflict</u>
Commercial Fishing	1,5,9,14,19	Dover Sole Spawning Ground
	2,3,6,7,10,11,15,16,20,24	Petracle Sole Spawning Ground
Marine Life	3,4,7,8,11,12 (plus commercial fishing tracts)	Hard rock outcrop, important benthic habitat
Geologic Hazards	1 through 12,14,15,16, 19,20,21,24	Mass movement
Aesthetics	13,18,22,23,26,27,28 29,30	Visual intrusion within 6 miles of shore

2. Alternative to Modify the Sale by Deleting the Point Arena Basin

a. Description: The Point Arena area proposed for leasing consists of 30 tracts, numbers 31 through 60 totaling 68,872 hectares (170,113 acres). This represents 12.94 percent of the total proposed sale area. Estimated recoverable oil and gas resources are 131 million barrels of oil and 134.2 billion cubic feet of gas (conditional mean estimates). Risked mean resource estimates are 25 million barrels of oil and 25 billion cubic feet of gas, which are 4.6 and 4.0 percent, respectively, of the total estimated resources within the proposed sale area.

Removal of all these tracts from the proposed sale would mean giving up, temporarily at least, the above estimated volumes of oil and gas. However, installations, effluents and their potential impacts, estimated to result from development of these leases, would be eliminated. The installations and effluents eliminated include: 14 exploratory wells

(average 8,000 feet depth), 87 development wells (average 6,000 feet depth), 1 production platforms 2 subsea completions, 13 miles of pipeline laid, 1 offshore storage and treating facility, 145,126 bbl of drill cuttings, 56,260 bbl of mud, 23,446 bbl of formation water and displacement of 49,936 cu yd of sediment.

b. Impacts: Each of the resources described in Section III.A and B are of concern. Deletion of the entire basin would, of course, eliminate all potential OCS related conflicts with all other resources. The major areas of concern for the Point Arena Basin are: 1) social/life style, 2) commercial fishing, 3) marine life (in general), 4) air quality, 5) geologic hazards, 6) recreation, 7) aesthetics and transportation. Table II.B.2.b-1 lists specific tracts which have been identified with specific environmental concerns or uses. Deletion of this basin from the sale would eliminate these potential impacts.

In addition to the elimination of potential conflicts, shown in Table II.B.2.b-1, it should be noted that deletion of all the Point Arena Basin would eliminate particular concerns over the following: loss of or interference with rural, historical and recreational qualities, loss of subsistence gathering lifestyle, population shifts that could place excessive stress of police and fire service, aggravation of existing highway 1 and 128 traffic problems and crowded port facilities at Fort Bragg. Also, there would be a loss of \$35,000,000 in expected income from lease related activities. For a detailed discussion of impacts, see Sections IV.B and C.

TABLE II.B.2.b-1

POTENTIAL TRACT CONFLICTS IN POINT ARENA BASIN

<u>Resource</u>	<u>Tract(s)</u>	<u>Potential Conflict</u>
Marine life	48,52,55,57,60	Proximity to major abalone grounds; rich intertidal areas and two sea bird rookeries (Devils Basin Rock and White Rock)
Geological hazards	33,37,38,41,43,45,48,49	Mass movement
Recreation	48,52,60	Proximity to abalone sport fishing grounds
Aesthetics	33,36,39,47,48,51,52,55,57,59,60	Visual intrusion within 6 miles of shore

3. Alternative to Modify the Sale by Deleting the Bodega Basin

a. Description: The area proposed for leasing in the vicinity of Bodega Bay consists of eight tracts, numbers 061 through 068, totalling 18,432 hectares (45,545 acres). This represents 3.46 percent of the total proposed sale area.

Estimated recoverable oil and gas resources are 23.2 million barrels of oil and 22.1 billion cubic feet of gas (conditional mean estimates). Risked mean resource estimates are 8 million barrels of oil and 8 billion cubic feet of gas, which are 1.5 and 1.3 percent respectively, of the total estimated resources within the proposed sale area.

Removal of all of these tracts from the proposed sale would mean giving up, temporarily at least, the above estimated volumes of oil and gas. However, installations, effluents, and their potential impacts estimated to result from development of these leases would be eliminated. The installations and effluents eliminated include: 6 exploratory wells (average 7000-foot depth), 26 development wells (average 5500-foot depth), 1 production platform, 1 offshore storage and treatment (on site) facility, 43,174 bbl of drill cuttings, 18,185 bbl of mud, and 4,545,000 bbl of formation water.

b. Impacts: Each of the resources described in Section III.A and B are of concern. Deletion of the entire basin would, of course, eliminate all potential OCS related conflicts with all other resources. The major areas of concern for the Bodega Basin are: 1) the proposed Pt. Reyes-Farallon Island marine sanctuary, 2) mariculture operations, 3) marine life, 4) geologic hazards and 5) recreation. Because of the small number of tracts in this basin, potential conflicts with the above resources are nearly ubiquitous throughout the basin.

Specific potential resource conflicts that could be avoided by deletion of the tracts are: 1) estuarine and wildlife habitat in Bodega Bay, Tomales Bay, Drakes Estero, Marin Estero, 2) major shorebird, waterfowl area (Tomales Bay), 3) oyster farming at Tomales Bay and Drakes Estero, 4) proximity to Point Reyes National Seashore and Golden Gate National Recreation Area. For a detailed discussion of impacts see Sections IV.B and C.

4. Alternative to Modify the Sale by Deleting the Santa Cruz Basin

a. Description: The Santa Cruz Area proposed for leasing consists of 59 tracts, numbers 069 through 128, totaling 133,296 hectares (329,241 acres). This represents 25.04 percent of the total proposed sale area. Estimated recoverable oil and gas resources are 123 million barrels of oil and 123 billion cubic feet of gas (conditional mean estimates). Risked mean resource estimates are 113 million barrels of oil and 113 billion cubic feet of gas which are 20.6 and 18.2 percent, respectively, of the total estimated resources within the proposed sale area.

Removal of all these tracts from the proposed sale would give up, temporarily at least, the above estimated volumes of oil and gas, and the following installations and effluents estimated to result from the development of these leases: 45 exploratory wells (7,000 feet average), 137 development wells (5,500 feet average), 4 production platforms, 1 subsea completion, 17 miles of pipeline laid, 1 offshore storage and treatment facility, 254,227 bbl drill cuttings, 110,142 bbl of mud, 29,637 bbl of formation water, and displacement of 81,222 cu. yds. of sediment.

b. Impacts: Each of the resources described in Section III.A and B are of concern. Deletion of the entire basin would, of course, eliminate all potential OCS related conflicts with all other resources. The major areas of concern for the Santa Cruz Basin are: 1) marine life, 2) proposed Pt. Reyes-Farallon Islands marine sanctuary, 3) air quality, 4) geologic hazards, 5) recreation and 6) aesthetics. Table II.B.4.b-1 lists specific tracts which have been identified with specific environmental concerns or uses. Deletion of the basin from the sale would eliminate these potential impacts. It should be noted that recreational use of the coast, opposite this basin is very heavy. The quality of the recreational experience is in part dependent upon the aesthetics of the area. Deleting this basin would have the most significant beneficial effect upon recreational and aesthetic resources. The reduction in potential impacts to sea otters could be the other most significant benefit of deleting Santa Cruz Basin. For a detailed discussion of all impacts see Sections IV.B and C.

TABLE II.B.4.b-1

POTENTIAL TRACT CONFLICTS IN SANTA CRUZ BASIN

<u>Resource</u>	<u>Tract(s)</u>	<u>Potential Conflict</u>
Marine life	76,80,84,88	Proximity to Bean Hollow intertidal area and James V. Fitzgerald Marine Reserve
Proposed Pt. Reyes- Farallon Island Sanctuary	69,73	Portions of these tracts are within the proposed sanctuary
Geologic hazards	114,128	
Recreation and aesthetic	71,72,75,76,79,80,83 84,87,88,92,99,103,107 111,113,117,118,122,128	Create a 6 mile buffer between possible OCS development and shore

5. Alternative to Modify the Sale by Deleting the Santa Maria Basin

a. Description: The Santa Maria Area, proposed for leasing, consists of 115 tracts, numbers 129 through 243, totaling 245,357 hectares (606,031 acres). This represents 46.10 percent of the total proposed sale area. Estimated recoverable oil and gas resources are 404 million barrels of oil and 409 billion cubic feet of gas (conditional mean estimates). Risked mean resource estimates are 402 million barrels of oil and 404 billion cubic feet of gas which are 73.3 and 65.1 percent, respectively, of the total estimated resources within the proposed sale area.

Removal of all these tracts from the proposed sale would mean giving up, temporarily at least, the above estimated volumes of oil and gas. However, installations, effluents and their potential impacts, estimated to result from development of these leases, would be eliminated. The installations and effluents eliminated include: 52 exploratory wells (average 5,000 foot depth), 351 development wells (average 4,000 foot depth), 12 production platforms, 2 subsea completions, 16 miles of pipeline laid, 1 offshore storage and treating facility, 495,042 bbl of drill cuttings, 187,850 bbl of mud, 96,522 bbl of formation water and displacement of 61,462 cu yd of sediment.

b. Impacts: Each of the resources described in Section III.A and B are of concern. Deletion of the entire basin would, of course, eliminate all potential OCS related conflicts with all other resources. The major areas of concern for the Santa Maria Basin are: 1) commercial fishing, 2) marine life, 3) proposed Santa Barbara Channel marine sanctuary, 4) Channel Islands National Park, 5) air quality, 6) geologic hazards, and 7) aesthetics. Table II.B.5.b-1 lists tracts which have been identified with specific environmental concerns or uses. Many of the tracts with potential aesthetic conflicts are only partial tracts. These are listed in Table II.B.5.b-2. Deletion of this basin from the sale would eliminate these potential impacts.

One of the most significant resource conflicts that could be eliminated by this deletion would be the conflict with the sea otter. For a detailed discussion of impacts see Sections IV.B and C.

TABLE II.B.5.b-1

<u>Resource</u>	<u>Tract(s)</u>	<u>Potential Conflict</u>
Commercial fishing	142,143,145,146,147,149,150 151,154,155,160,161,166,167 168,173,174,175,181,182,187 188,194,195,200,201	Spot prawn grounds; these organisms may be sensitive to drilling muds and cuttings
Aesthetics	138,142,143,146,147,151 203,209,210,217,224,229 230,234,238 Note: Portion 5% to 90% of the following are also within 6 miles of shore (See Table II.B.5-2) 130,131,134,137,141 144,145,149,150,154,155,189 196,202,208,215,216,222,223 228,233,236,237,240,241,242 243	Visual intrusion within 6 miles of shore
Marine life	Same as tracts as above	Provide an additional buffer between development and the sea otter, sea bird rookeries, sea lion haul out areas, and sensitive intertidal communities
Geologic hazards	131,138,142,143,146,147, 150,151,155 through 159, 161,162 through 165,168, 175,182,189,196,203,210, 217,226,227,228,231,232, 233,235,236,237,239	Mass movement

TABLE II.B.5.b-2

SANTA MARIA BASIN TRACTS WITHIN SIX MILES OF SHORE

<u>Tract No.</u>	<u>% Tract Deleted</u>
130	20
131	40
134	25
137	50
141	35
144	10
145	75
149	20
150	85
154	10
155	60
189	85
196	35
202	20
208	30
215	5
216	80
222	10
223	90
228	35
233	45
236	20
237	90
240	40
241	95
242	
243	

6. Alternative to Modify the Sale to Improve Air Quality

The DEIS contained an alternative to modify the sale by establishing a six mile buffer zone in the Santa Maria and Santa Cruz basins to improve air quality. That alternative has been deleted from further consideration because controls mandated by new DOI regulations have reduced the need for further mitigation.

Since the time the DEIS was prepared USGS has promulgated regulations to control air pollutant emissions that significantly affect onshore air quality. These regulations contained provisions that mandate more stringent emission controls on those sources close to shore than those located further offshore. In effect, the regulations already take into account the additional dilution that the three mile greater distance to shore would have provided. For this reason deletion of tracts between 3 and 6 miles would not substantially reduce air quality impacts.

7. Alternative to Modify the Sale by Creating a 6-mile Buffer Zone Within the Santa Maria Basin to Enhance Sea Otter Protection

a. Description: Santa Maria tracts 130, 131, 134, 137, 138, 141, 142, 143, 144-147, 149, 150, 151, 154, and 155, or portions of these tracts, are located within six miles of the sea otter range (Volume II: Visual No. 7). This alternative provides an option to ensure no OCS exploration and development occurs within six miles of the sea otter range (Figure II.B.7.a-2) through the establishment of a 6-mile buffer zone in the northern Santa Maria tracts (Figure II.B.7.a-1). The buffer zone could be established through the deletion of tracts (138, 142, 143, 146, 147, and 151) and establishment of a stipulation which would require that no development activities take place within six miles of the coast for tracts 130, 131, 134, 137, 141, 144, 145, 149, 150, 154, and 155. Figure II.B.7.a-1 shows the tracts that could be deleted and stipulated under this alternative.

The tracts or portion of tracts that may be deleted under this alternative represent 1.2 percent of the total proposed sale area (6,264 hectares). Although the U.S. Geological Survey feels the oil and gas resources are relatively low in the northern portion of the Santa Maria Basin, Mr. Heck (Ogle Petroleum, Inc.) testified at the No. 53 Public Hearing in San Luis Obispo that, in his opinion, some of the tracts within six miles of the coast off Santa Maria (3-mile buffer zone) may have a high potential for oil and gas.

This alternative is not the same alternative presented in the DEIS. The Sea Otter Alternative has been changed because the FEIS has developed an alternative for the total or partial deletion of tracts within the Santa Maria Basin. Under Alternative 5 ("Alternative to Modify the Sale by Deleting the Santa Maria Basin"), and additionally Alternative 4 ("Alternative to Modify the Sale by Deleting the Santa Cruz Basin"), the

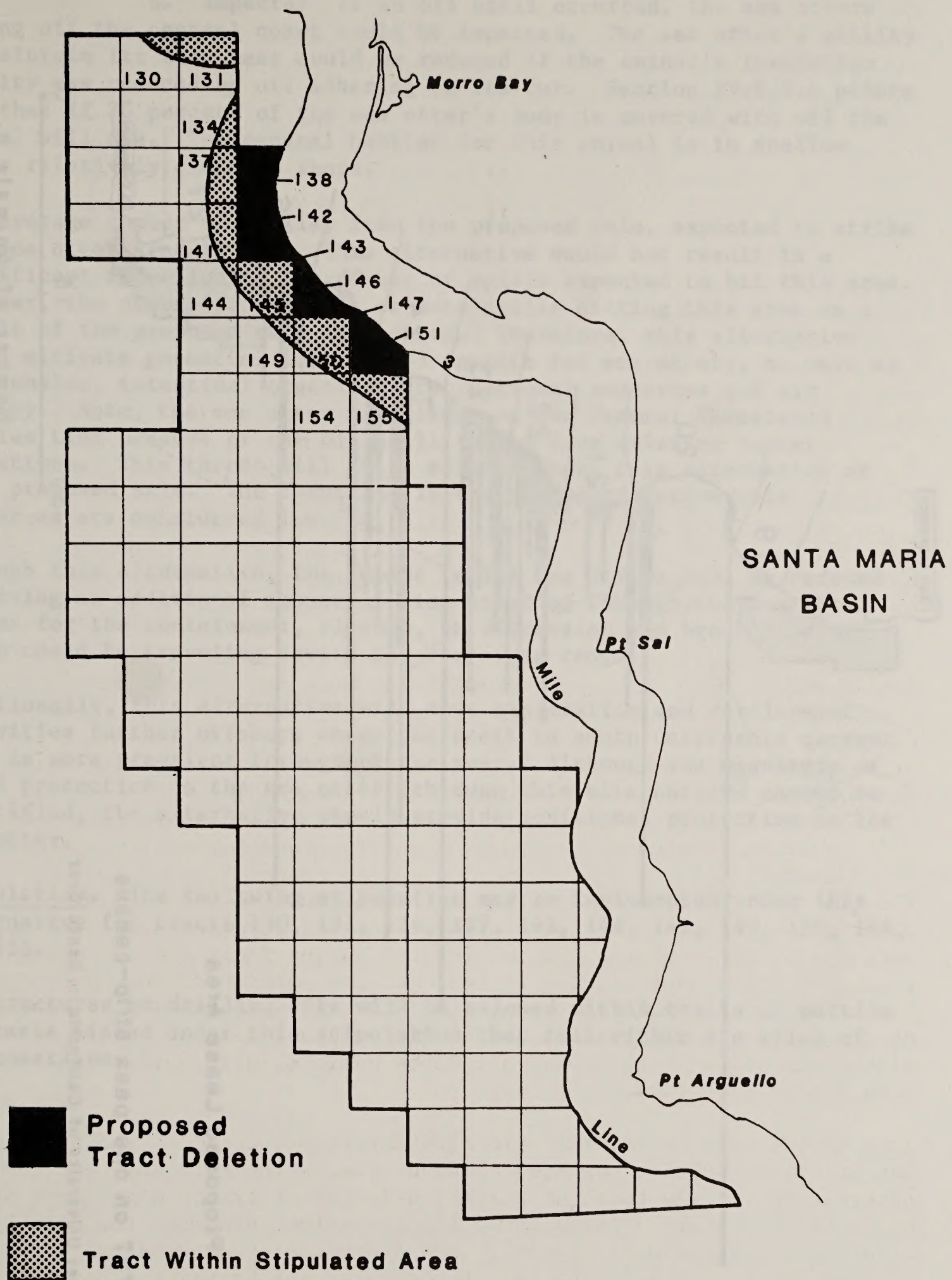


Figure II.B.7.a-1 Proposed Tract Deletions and Areas to be Stipulated for Alternative 7 (Sea Otter)

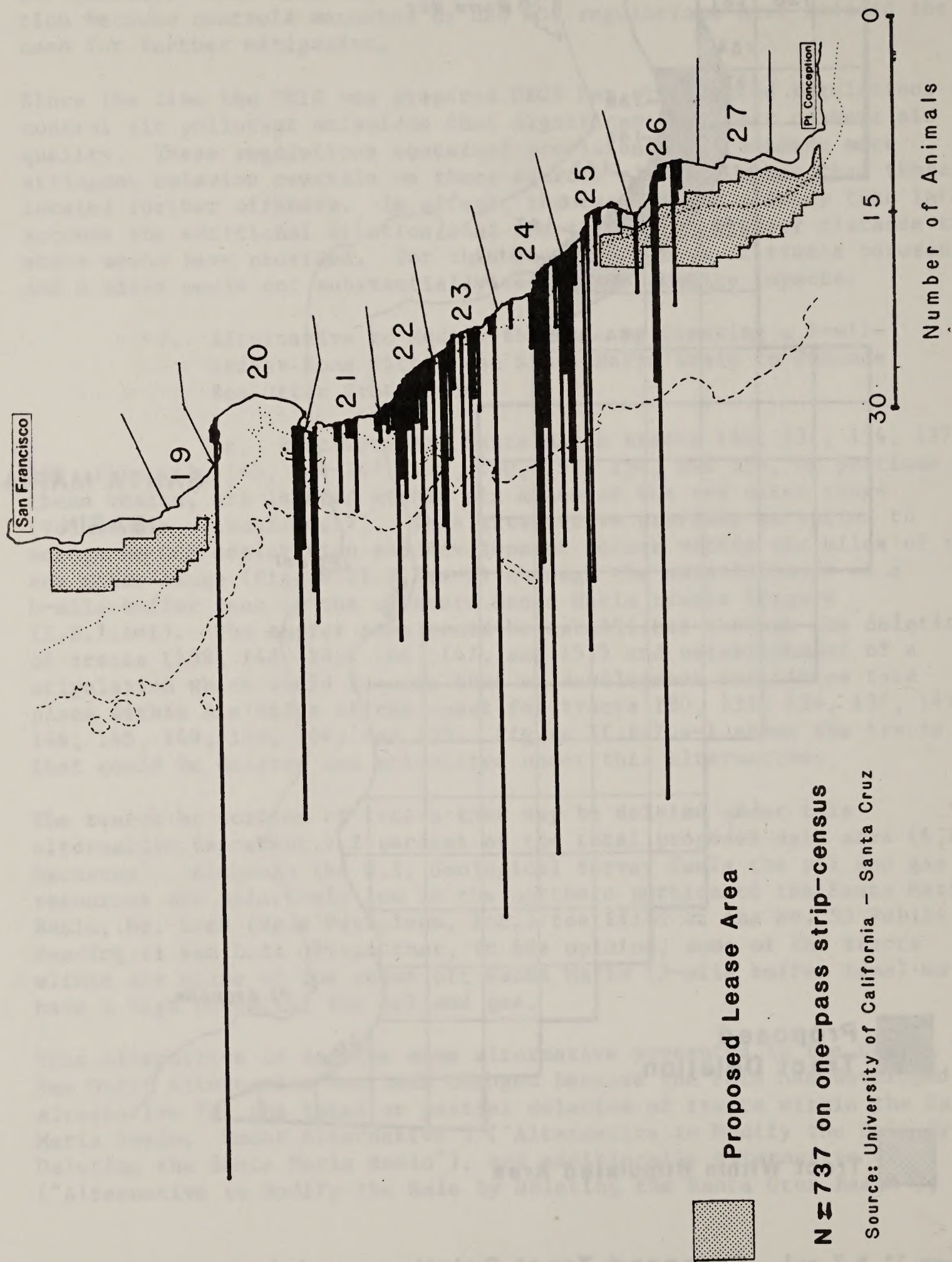


Figure II.B.7.a-2 Distribution of Sea Otters Between Santa Cruz and Point Sal, 5 May 1980.

option is made available to delete tracts within both the Santa Maria and Santa Cruz Basin for the protection of the sea otter.

b. Impacts: If an oil spill occurred, the sea otters living off the central coast could be impacted. The sea otter's ability to maintain its body heat could be reduced if the animal's insulation ability was reduced by oil adhering to its fur. Section IV.B.2.c points out that if 20 percent of the sea otter's body is covered with oil the animal will die. The general habitat for this animal is in shallow water relatively close to shore.

The average number of spills, from the proposed sale, expected to strike the sea otter area is low. This alternative would not result in a significant reduction in the number of spills expected to hit this area. However, the probability of one or more spills hitting this area as a result of the proposed sale is reduced. Therefore, this alternative would mitigate potential Sale No. 53 impacts for sea otters, as well as Gray whales, intertidal organisms, recreational resources and air quality. Note, the sea otter was placed on the Federal Threatened Species List because of the oil spill threat from existing tanker operations. This threat will still exist without this Alternative or this proposed sale. The reduction in the estimated recoverable resources are considered low.

Through this alternative, the impact to the sea otters will be reduced by giving an additional amount of time provided through the 6-mile buffer for the containment, cleanup, or dispersion and breakup of oil which could be traveling toward the sea otter range.

Additionally, this alternative will move exploration and development activities further offshore where the north to south California current flow is more prevalent throughout the year. Although the magnitude of added protection to the sea otter (through this alternative) cannot be quantified, the alternative should provide additional protection to the sea otter.

Stipulation. The following stipulation may be implemented under this alternative for tracts 130, 131, 134, 137, 141, 144, 145, 149, 150, 154, and 155.

No structures or drilling rigs will be allowed within tracts or portion of tracts listed under this stipulation that fall within six miles of the coastline.

8. Alternative to Modify the Sale by Deleting Part of the Eel River Basin to Enhance Protection of Commercial Fisheries

a. Description: This alternative would eliminate tracts 1, 5, 9, 14 and 19 which overlap the Dover sole (Microstomus pacificus) spawning grounds and tracts 2, 3, 6, 7, 10, 11, 15, 16, 20 and 24 which overlap the Petrale sole (Eopsetta jordani) spawning grounds. These two groups of tracts comprise 50 percent of the total number and 52 percent by area of the Eel River Basin tracts (see Figure II.B.8.a-1). This is only six (6) percent of the total proposed sale area.

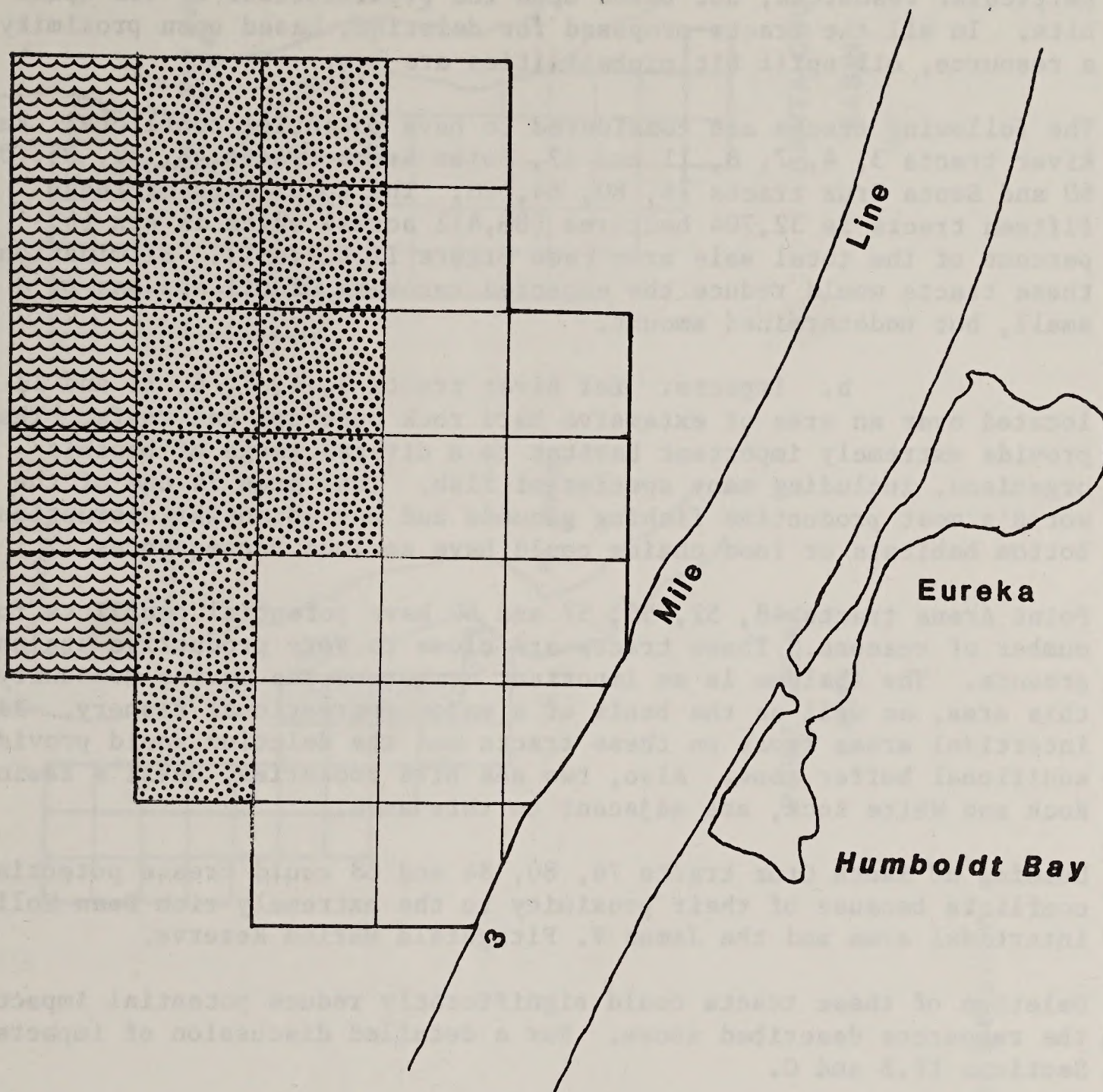
Eliminating these tracts would be expected to, very roughly, reduce the recoverable gas resources, the number of manmade structures, the amount of effluents and discharges, and the amount of vessel traffic in the Eel River Basin by 50 percent. Since no recoverable oil is anticipated for this basin, this alternative will not reduce access to recoverable oil resources.

b. Impacts: Although the California shelf is intermediate in productivity, from a worldwide standpoint, the Eel River Basin is one of the world's most productive fishing grounds. Moiseev (1971) reported the worldwide range in fish productivity was 10 to 3,000 kg/km² with California producing 500-700 kg/km². However, production in parts of the Eel River Basin exceeds 2,500 kg/km² based on data obtained from the California Department of Fish and Game.

Clearly, this area is extremely rich, and flatfish (primarily Petrale and Dover sole) represent one of the most important fish groups harvested in the Eel River Basin. In 1975, the most recent year for which there is comprehensive data, 3,900,000 pounds of flatfish worth \$586,000 were caught in this basin. This represents over 10 percent of all flatfish caught in California. As noted above, Petrale and Dover sole both have important spawning grounds in this basin. Discharge of drilling muds and cuttings could deleteriously affect the spawning grounds, spawning behavior, and the survival of eggs, larvae, and juveniles. Manmade structures could cause physical disruption of the spawning grounds. Disruption of these spawning areas probably would seriously impact the populations and their fisheries. This alternative would eliminate impacts from drilling muds, drill cuttings and manmade structures by eliminating tracts that overlap these spawning areas. Similar spawning areas are not known to occur in any of the other proposed lease tract basins.

Adoption of this alternative could also reduce impacts from the proposed sale to air quality, harbor seals, birds, terrestrial plants and animals, the endangered gray whale, other biological communities, other commercial and sport fisheries, the population, employment, the economy, a proposed traffic lane, cultural resources and geohazards (see Sections IV.B and IV.C).

EEL RIVER BASIN



Dover Sole Spawning Ground



Petrale Sole Spawning Ground

Figure II.B.8.a-1 **Proposed Tract Deletion for Alternative 8
(Commercial Fisheries)**

9. Alternative to Modify the Sale by Deleting Tracts to Enhance Protection of Sensitive Biological Areas

a. Description: This alternative lists possible deletion options not already listed under the sea otter and commercial fishing alternatives (numbers 7 and 8). The tracts were recommended by the California Department of Fish and Game or Humboldt County Board of Supervisors and were suggested primarily because of the proximity to particular resources, not based upon the probabilities of oil spill hits. In all the tracts proposed for deletion, based upon proximity to a resource, oil spill hit probabilities are low.

The following tracts are considered to have potential conflicts: Eel River tracts 3, 4, 7, 8, 11 and 12, Point Arena tracts 48, 52, 55, 57, 60 and Santa Cruz tracts 76, 80, 84, 88. The total area of these fifteen tracts is 32,704 hectares (80,812 acres) which is six (6) percent of the total sale area (see Figure II.B.9.a-1). Elimination of these tracts would reduce the expected recovery of oil and gas by a small, but undetermined amount.

b. Impacts: Eel River tracts 3, 4, 7, 8, 11 and 12 are located over an area of extensive hard rock outcrops and reefs. These provide extremely important habitat to a diverse range of benthic organisms, including many species of fish. This area is one of the world's most productive fishing grounds and any potential disruption of bottom habitats or food chains could have serious consequences.

Point Arena tracts 48, 52, 55, 57 and 60 have potential conflicts for a number of reasons. These tracts are close to very productive abalone grounds. The abalone is an important member of the marine community in this area, as well as the basis of a major recreational fishery. Rich intertidal areas front on these tracts and the deletion would provide an additional buffer zone. Also, two sea bird rookeries, Devil's Basin Rock and White Rock, are adjacent to this area.

Leasing of Santa Cruz tracts 76, 80, 84 and 88 could create potential conflicts because of their proximity to the extremely rich Bean Hollow intertidal area and the James V. Fitzgerald Marine Reserve.

Deletion of these tracts could significantly reduce potential impacts to the resources described above. For a detailed discussion of impacts see Sections IV.B and C.

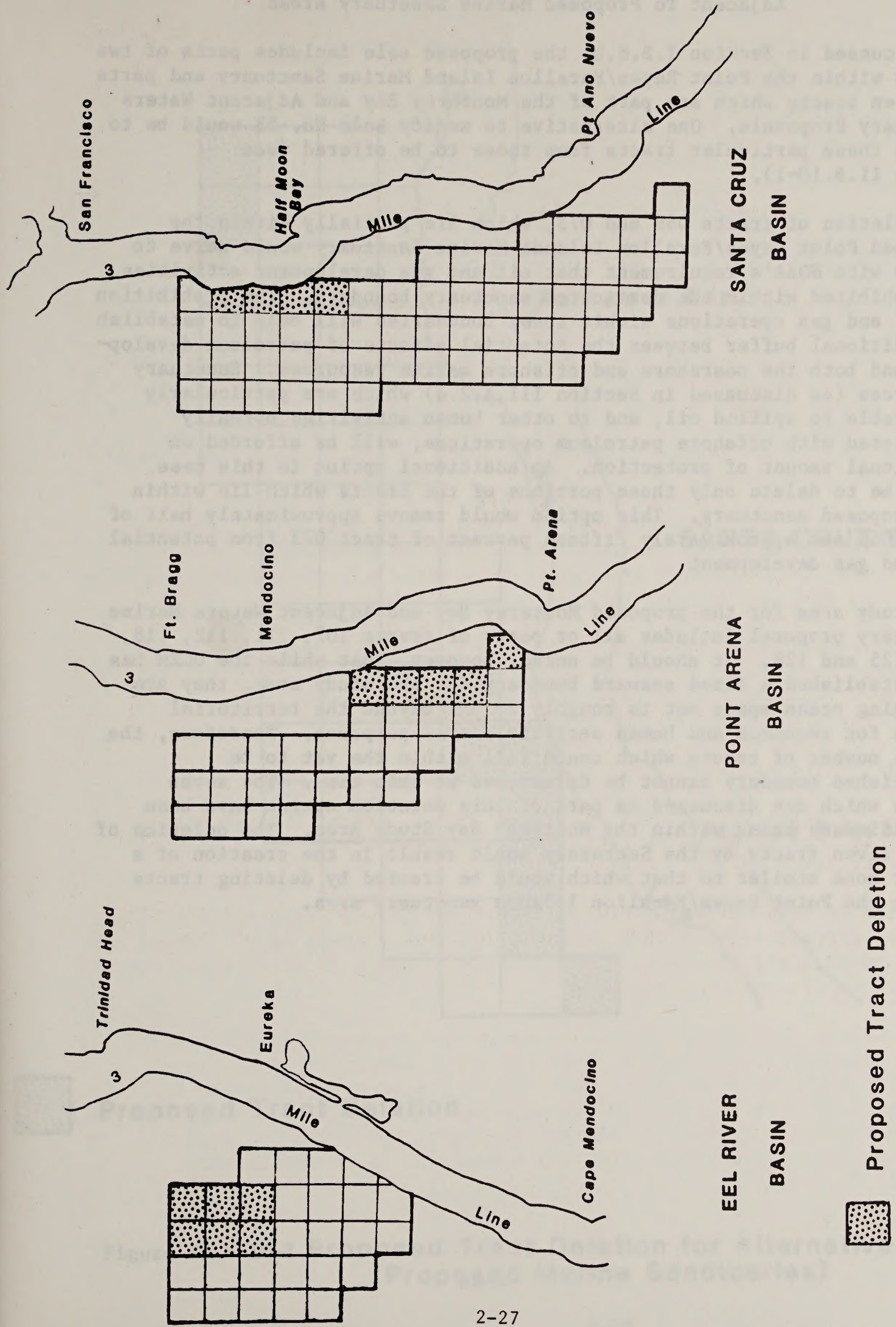


Figure II.B.9.a-1 Proposed Tract Deletion for Alternative 9 (Sensitive Biological Areas)

10. Alternative to Modify The Sale by Deleting Tracts
Adjacent To Proposed Marine Sanctuary Areas

As discussed in Section I.B.8.b, the proposed sale includes parts of two tracts within the Point Reyes/Farallon Island Marine Sanctuary and parts of seven tracts which are part of the Monterey Bay and Adjacent Waters Sanctuary Proposals. One alternative to modify Sale No. 53 would be to delete these particular tracts from those to be offered (see Figure II.B.10-1).

The deletion of tracts 069 and 073, which lie partially within the proposed Point Reyes/Farallon Islands Marine Sanctuary would serve to comply with NOAA's requirement that oil and gas development activities be prohibited within the designated sanctuary boundary. The prohibition of oil and gas operations within these boundaries will help to establish an additional buffer between the potential effects of petroleum development and both the nearshore and offshore marine resources. Sanctuary resources (as discussed in Section III.A.2.d) which are particularly vulnerable to spilled oil, and to other human activities normally associated with offshore petroleum operations, will be afforded an additional amount of protection. An additional option in this case would be to delete only those portions of the tracts which lie within the proposed sanctuary. This option would remove approximately half of tract 069 and approximately fifteen percent of tract 073 from potential oil and gas development.

The study area for the proposed Monterey Bay and Adjacent Waters Marine Sanctuary proposal includes all or parts of tracts 107, 111, 112, 118, 122, 125 and 128. It should be noted, however, that while the OCZM has not established a fixed seaward boundary for the study area, they are including ocean space out to roughly 20 NMI beyond the territorial waters for resource and human activity survey purposes. Therefore, the actual number of tracts which could fall within the yet to be established boundary cannot be determined at this time. The seven tracts which are discussed as part of this deletion option have been identified as being within the Monterey Bay Study Area. The deletion of these seven tracts by the Secretary would result in the creation of a buffer zone similar to that which would be created by deleting tracts within the Point Reyes/Farallon Islands sanctuary area.

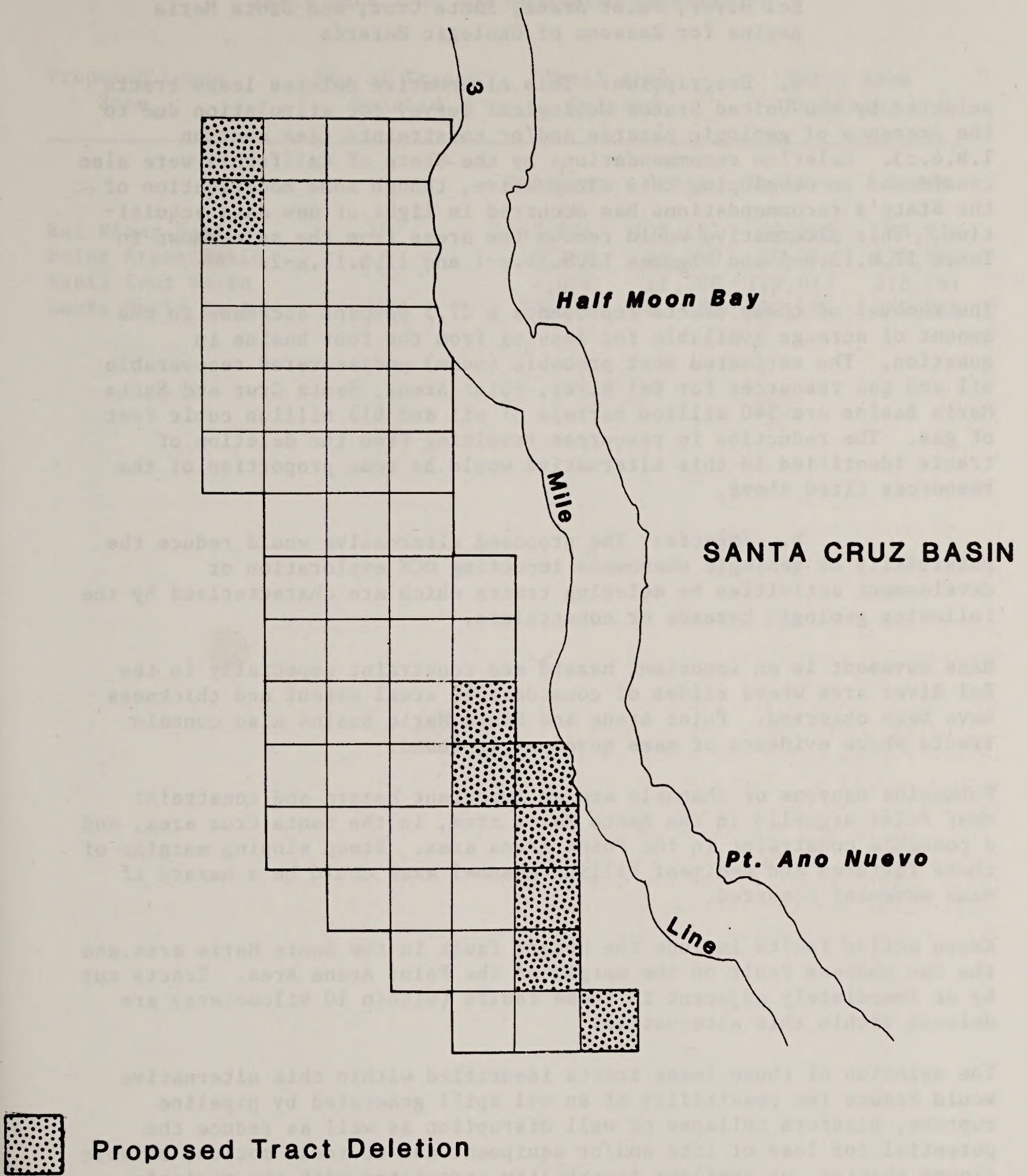


Figure II.B.10-1 Proposed Tract Deletion for Alternative 10
(Proposed Marine Sanctuaries)

11. Alternative to Modify the Sale by Deleting Part of the Eel River, Point Arena, Santa Cruz, and Santa Maria Basins for Reasons of Geologic Hazards

a. Description: This alternative deletes lease tracts selected by the United States Geological Survey for stipulation due to the presence of geologic hazards and/or constraints (see section I.B.6.c). Deletion recommendations by the State of California were also considered in developing this alternative, though some modification of the State's recommendations has occurred in light of new data acquisition. This alternative would remove the areas from the sale shown in Table II.B.11.a-1 and Figures II.B.11.a-1 and II.B.11.a-2.

The removal of these tracts represents a 27.3 percent decrease in the amount of acreage available for leasing from the four basins in question. The estimated most probable (mean) undiscovered recoverable oil and gas resources for Eel River, Point Arena, Santa Cruz and Santa Maria Basins are 540 million barrels of oil and 613 billion cubic feet of gas. The reduction in resources resulting from the deletion of tracts identified in this alternative would be some proportion of the resources cited above.

b. Impacts: The proposed alternative would reduce the possibility of geologic phenomena impacting OCS exploration or development activities by deleting tracts which are characterized by the following geologic hazards or constraints.

Mass movement is an important hazard and constraint especially in the Eel River area where slides of considerable areal extent and thickness have been observed. Point Arena and Santa Maria Basins also contain tracts where evidence of mass movement is found.

Submarine canyons or channels are an important hazard and constraint near Point Arguello in the Santa Maria area, in the Santa Cruz area, and a possible constraint in the Point Arena area. Steep sloping margins of these features and sediment filling channel axes could be a hazard if mass movement occurred.

Known active faults include the Hosgri fault in the Santa Maria area and the San Andreas Fault on the margin of the Point Arena Area. Tracts cut by or immediately adjacent to these faults (within 10 kilometers) are deleted within this alternative.

The deletion of those lease tracts identified within this alternative would reduce the possibility of an oil spill generated by pipeline rupture, platform collapse or well disruption as well as reduce the potential for loss of life and/or equipment due to fault motion, seismic ground shaking, or seafloor instability associated with the geologic features identified above. For additional detail on impact see Section IV.B and C.

TABLE II.B.11.a-1

TRACT DELETIONS FOR GEOHAZARD ALTERNATIVE

Proposed Lease Zone	No. of Tracts Deleted	Total Area Deleted		Total Area Remaining	
		Hectares	Acres	Hectares	Acres
Eel River Basin	19	43,776	108,167	22,223	54,916
Point Arena Basin	8	18,288	45,190	50,394	124,524
Santa Cruz Basin	2	4,608	11,386	129,013	318,791
Santa Maria Basin	37	73,670	182,039	172,184	449,818

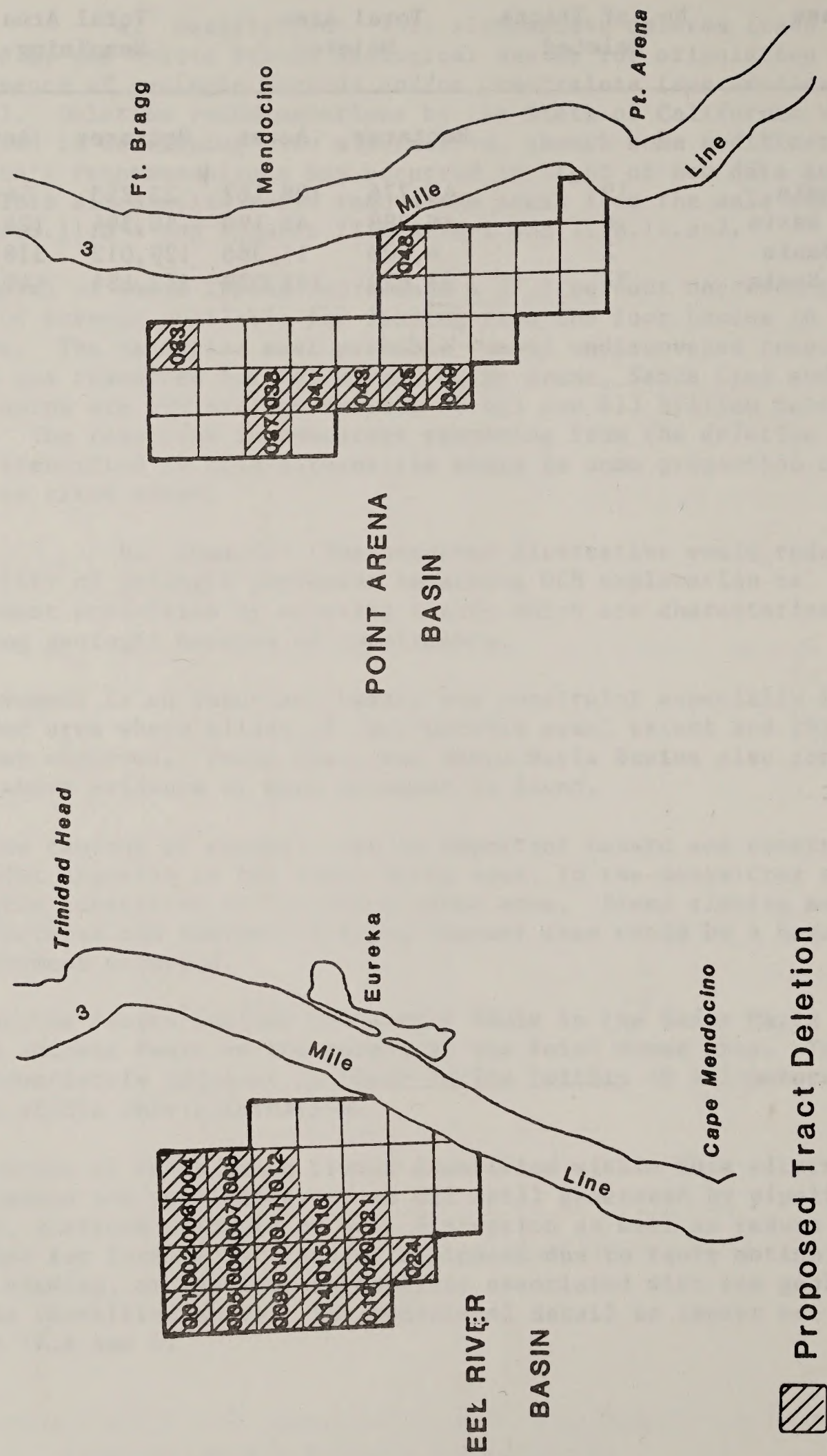


Figure II.B.11.a-1 Proposed Tract Deletion for Alternative 11 (Geohazards)

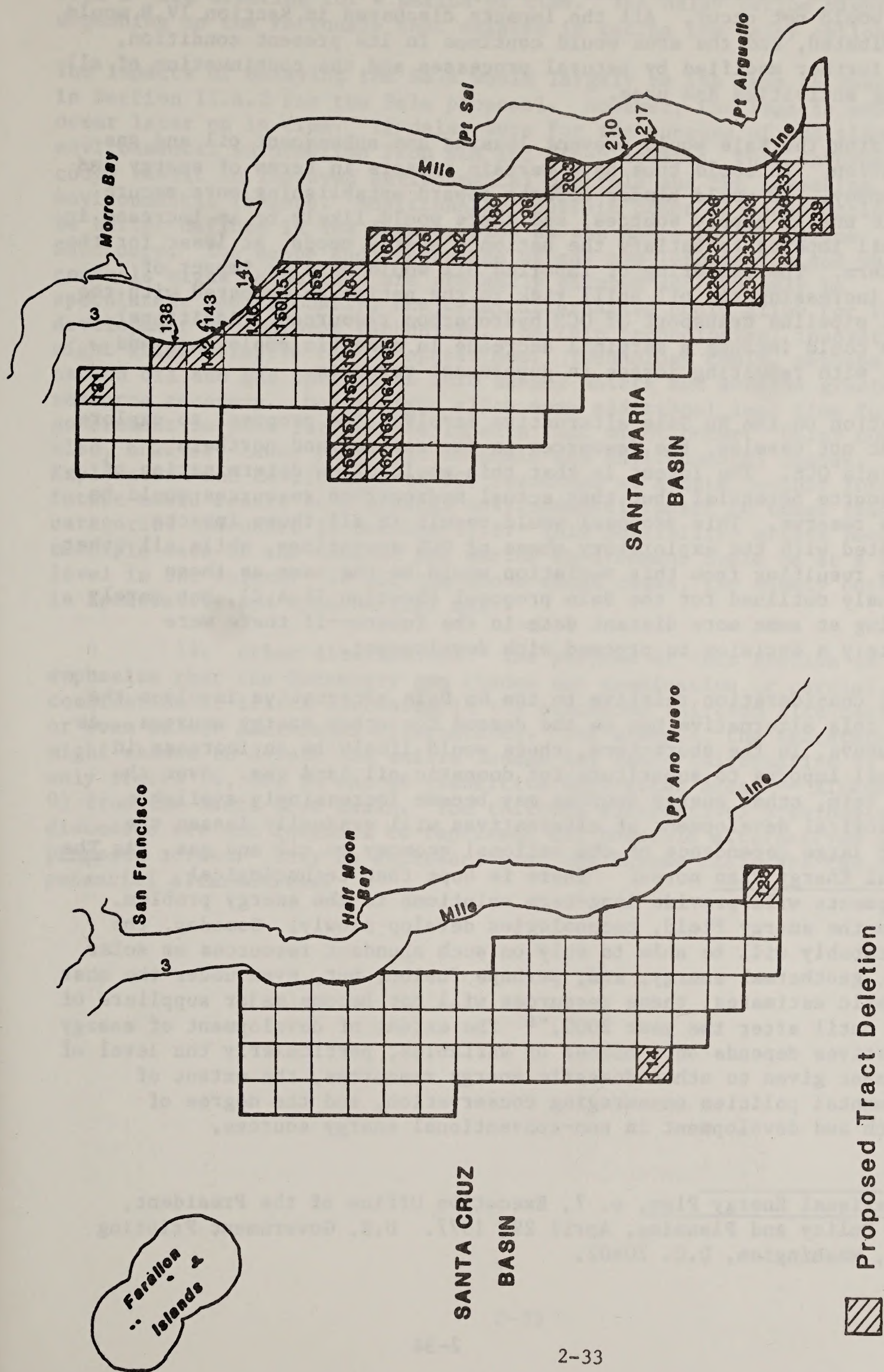


Figure II.B.11.a-2 Proposed Tract Deletion for Alternative 11 (Geohazards)

12. No-Sale Alternative: This alternative would constitute the No Action alternative. All activity anticipated under the proposed action would not occur. All the impacts discussed in Section IV.B would be eliminated, and the area would continue in its present condition, though further modified by natural processes and the continuation of all existing activities and uses.

Not holding the Sale would prevent leasing and subsequent oil and gas exploration. It could thus have certain impacts in terms of energy and the economy. It would hinder efforts toward establishing more secure domestic energy supply sources, and there would likely be an increase in crude oil imports to satisfy the nation's energy needs, at least for the short term. The tankering of imported oil would have an impact of likely increasing the oil spill risk to the nation as compared with the general pipeline transport of OCS hydrocarbon resources. Additional impacts could include a marginal decrease in domestic employment and income, with resulting losses in government revenues.

A variation on the No Sale alternative involves the proposal to explore for, but not develop, the resources in the central and northern California OCS. The intent is that this would allow determination of the resource potential, but that actual hydrocarbon resources would be held in reserve. This proposal would result in all those impacts associated with the exploratory phase of OCS operations, while all other impacts resulting from this variation would be the same as those previously outlined for the Sale proposal (Section II.A.2), but merely occurring at some more distant date in the future--if there were ultimately a decision to proceed with development.

A final consideration relative to the No Sale alternative involves the impact this alternative has on the demand for other energy sources. As noted above, in the short-term, there would likely be an increase in crude oil imports to substitute for domestic oil and gas. Over the longer term, other energy sources may become increasingly available. Technological development of alternatives will gradually lessen the current large dependence of the national economy on oil and gas. As The National Energy Plan notes: "There is hope that technological developments will provide long-term solutions to the energy problem. But, in the energy field, technologies develop slowly. Someday, the U.S. probably will be able to rely on such abundant resources as solar energy, geothermal energy, and, perhaps fusion; but, even under the most optimistic estimates, these resources will not become major suppliers of energy until after the year 2000."^a The extent of development of energy alternatives depends on a number of variables, particularly the level of investment given to other domestic energy resources, the extent of governmental policies encouraging conservation, and the degree of research and development in non-conventional energy sources.

^aThe National Energy Plan, p. 7, Executive Office of the President, Energy Policy and Planning, April 29, 1977. U.S. Government Printing Office, Washington, D.C. 20402.

13. Delay the Sale Alternative: An alternative of delaying the Sale always exists. In delaying the Sale, tracts would be withheld from a sale offering for a period of time. The delay period might vary, depending on the rationale that existed in taking the Delay option.

The impacts of delaying the Sale would largely be the same as described in Section II.A.2 for the Sale proposal. However, the impacts would occur later on in time. If delay were for the purpose of additional environmental information from BLM and other studies, this information could result in improved environmental controls and the lessening of environmental impacts. Additionally, certain other proposed actions may be better defined in the future, such as the Monterey Bay Marine Sanctuary. The scope and importance of any new information and what controls might be devised are presently unknown and can only be speculated. Additionally, the delay alternative could allow for the development of improved technology. Certain technological innovations might arise relative to OCS operations. Technology could, perhaps, extend oil and gas operations into deeper waters and achieve greater resource recovery. Delay might allow some additional lead time for government to plan for onshore impacts that might occur. Delay could also, however, cause potential economic and environmental losses. Exploration and development of OCS resources at a date further into the future could result in a greater environmental impact to those resource categories discussed in Section IV.B. This possibility exists because multiple uses of the coastal and marine environment could be at a higher level in the future. In all the above noted cases, the likely outcome is speculative and hypothetical only.

14. Other Alternatives: The purpose of this section is to emphasize that the Secretary can choose any combination or partial combination of tracts discussed in the preceding thirteen alternatives, or even select additional alternatives. For example, the Secretary might choose to delete the entire Bodega Bay Basin (Alternative 3) but only tracts 76, 80, 84 and 88 (Sensitive Biological Areas -- Alternative 9) from the Santa Cruz Basin. The thirteen alternatives previously discussed are not intended to represent all possible alternatives to the proposed action. They do represent what the Bureau feels are the major potential alternatives.

III. AFFECTED ENVIRONMENT

A. Natural Environment

The following section is devoted to a discussion of the natural environment characterizing the Sale No. 53 lease area. Included within is a description of the physical environment addressing geology, oceanography, and air and water quality, as well as a discussion of the biological habitats interacting within the context of this physical environment.

Informational sources for these discussions include findings from the most recently completed research as well as baseline studies conducted in years past, the results of which have formed a foundation for the present body of knowledge.

1. Physical Environment

a. Geological and Mineral Resources

i. Geologic Description: The central and northern California OCS contains five basins that lie on the shelf or partially on the adjacent continental slope.

The Santa Maria Basin offshore is the southernmost in the area of the proposed OCS Lease Sale No. 53 extending from Point Arguello northwest to Point Sur just south of Monterey. It measures 40 km by 230 km and is elongate parallel to the coast (see Visual Errata No. 1). It is bounded on the northeast by Franciscan basement rocks that have been elevated along major coastal faults, and on the southwest by the Santa Lucia High, an elevated basement block that forms the relatively shallow Santa Lucia Bank. The northwest end of the basin continues onto the continental slope, and the south end of the basin is defined for purposes of the proposed lease sale as latitude 34-50.

Structural trends (fold axes and faults) in the northern two-thirds of the basin parallel the shoreline. The structures generally appear to have been initiated by at least early Tertiary time and persisted into late Miocene. Just south of Point Sur there is evidence for present day compression and thrusting in the basin sediments that lie adjacent to high angle reverse faults that bound the northeast edge of the basin. This deformation is associated with surface slumping. Structural trends in the southern third of the basin are north-south, oblique to the shoreline and the bounding Santa Lucia High (Hoskins and Griffiths, 1971). Considerable evidence for compression is also present in this area. Low angle thrusting initiated in at least early Tertiary time, appears to have continued through Quaternary time. (See Visual Errata No. 1) for detailed geologic sections and stratigraphic columns.)

Outer Santa Cruz Basin. This relatively shallow late Tertiary basin, which measures approximately 25 km by 100 km, trends northwest across the shelf, and extends onto the adjacent continental slope. It is bounded on the west by the Outer Santa Cruz High and on the northeast by the Pigeon Point High. The structural axis of the basin and the Outer Santa Cruz High plunge to the northwest, beyond the edge of the continental shelf.

Sediments thicken down the slope, and appear to be limited along the toe of the slope by a discontinuous volcanic ridge along which the Mulberry, Guide and Pioneer Seamounts form prominent topographic highs. The southeast margin of the basin is marked by high angle reverse faults with a vergence to the west. The southwestern basin margin does not appear to be fault controlled. The northeastern margin is controlled by a down-to-basin fault that displaces rocks up to at least the upper Miocene unconformity (see Visual Errata No. 1).

Bodega Basin. Bodega Basin lies northeast of the Farallon-Pigeon Point High. It is bounded on the east by the San Andreas fault and down-to-basin faults along which granite basement has been elevated, and to the southwest in the Gulf of the Farallons by a structural high of deformed Neogene sediments. This basin is approximately 180 km long and has an average width of approximately 25 km.

Point Arena Basin. The eastern and northern margins of the Point Arena basin are well defined by the San Andreas fault as it runs northwestward from Point Arena and swings westward along the Mendocino Escarpment (Curry and Nason 1967). The basin has a length of approximately 140 km. The average width of the basin to the 1,000 m isobath is about 20 km; however, the western edge of the basin lies well offshore of the 1,000 m isobath, the depth limit in proposed OCS Lease Sale No. 53, and is formed by a partially buried structural high mapped by Curry (1966). The high trends northwestward away from the coast, giving the basin a width of 30 km at the south and about 55 km to the north (Visual Errata No. 1).

Eel River Basin. Of the five north central California basins considered, Eel River is the largest in areal extent and possibly volume of marine strata. The basin extends from near Cape Mendocino (40°30'N) on the northern California coast northward for 200 km (125 miles) to Cape Sebastian (42°20'N) in southern Oregon, and from the coastline seaward to the continental slope, an average distance of about 70 km (44 miles) (Visual Errata No. 1). The south end of the basin extends inland for about 50 km (30 miles) in the lower Eel River-Arcata Bay area. The basinal outline encloses an area of 10,360 sq. km (4,000 sq. miles) which contains an estimated 29,270 cu km (7,000 cu. miles) of marine Miocene and younger strata (Hoskins and Griffiths 1971).

The axis of the Eel River basin trends N 80° W onshore (Ogle 1953), but swings to a near northerly orientation offshore (Hoskins and Griffiths

1971; Silver 1971a). Folds onshore parallel the basin margin and associated faults are thrusts and high-angle reverse faults, apparently reflecting NE-SW to N-S compression of the basin (Ogle 1953). Pleistocene strata are gently folded along older structural axes of the Wildcat Group.

Major structures offshore also parallel the basin trend. On the continental slope and adjacent marginal plateau folds involving Pliocene and possibly younger strata are expressed in the sea floor and are cut by high-angle reverse faults having dip separations that are predominantly west-side down (Visual Errata No. 1) (Silver 1971). This structural pattern is interpreted as resulting from E to NE directed compression of the continental margin related to Quaternary underthrusting of the Gorda Plate. A major northwest-trending fault showing Quaternary displacement separates thick sections of Mesozoic and Cenozoic rocks south of Crescent City (Jennings 1975). Associated with this fault are en-echelon folds that are stepped to the right (Silver 1971). First motion studies of earthquakes during 1962-1965 indicate right-slip (Bolt, et al. 1968) and Silver (1971) interprets this motion as the result of shear interaction between the Pacific and North American lithospheric plates.

Petroleum Appraisal. The offshore area in proposed OCS Lease Sale No. 53 lies adjacent to three onshore basins shown in Visual Errata No 1. Santa Maria Basin onshore and basins in the adjacent Salinian province may be quasi-equivalents of the Santa Maria offshore and Bodega basins. However, the onshore basins are thought by some to be separated from the offshore basins by major faults that may have had considerable late Neogene strike-slip displacement (Graham 1976; Hall, 1975). Eel River Basin, lying north of the region of Neogene strike-slip faulting clearly extends ashore as the Humboldt Basin. Petroleum production from all of these onshore basins has been relatively small. Humboldt Basin has had no significant oil production and cumulatively the others constitute an average of 6 percent of California's total onshore oil production.

Geological estimates of the amounts of undiscovered recoverable oil and gas in the offshore basins are shown in Tables I.B.2.b-1 and -2.

Previous Petroleum Exploration. Petroleum industry and geophysical company exploration of the proposed OCS Lease Sale No. 53 area has proceeded over the last two decades. Some industry exploration was done in anticipation of and following the May 14, 1963 lease sale that included these shelf basins. Following the 1963 lease sale, nineteen exploratory wells were drilled from ships. (A tabulation of the 1963 leasing events is given in Table III.A.1.a.i-1). Most targets appear to have been structural rather than stratigraphic traps. Hydrocarbons encountered in offshore exploratory drilling were deemed insignificant (according to economic conditions prevailing at the time of the studies) and all wells were abandoned.

TABLE III.A.1.a.i-1

OCS LEASING HISTORY--CENTRAL AND NORTHERN CALIFORNIA, 1963

Basin	# Leases Offered	# Leased	Total of Winning Bonuses	# of Subse- quent Wells Drilled (see Table)	Status
Eel River		17		4	quit claimed
Point Arena	21	5	557,843	3	" "
Bodega (and Santa Cruz)	41	27	6,585,981	9	" "
Outer Santa Cruz	13	2	162,432	2	" "
Santa Maria		6	1,307,231	1	" "
TOTAL		40		19	

Source: After McCulloch, et al. 1977

ii. Non-Petroleum Mineral Resources: The most exploitable non-petroleum materials on the northern California OCS at present are sand and gravel. The sources for sand and gravel are of three principal types; glacial deposits of the Pleistocene age, formed when the sea level was lower; deposits derived from rivers that drain the adjoining land masses; and sand dune deposits. Sand or the larger sediment fractions tend to accumulate on the continental shelf on broad plateaus where the current or surge may be high, creating a turbulent environment restricting fine sediment from settling. Sand deposits are usually relatively close to shore or near the source of the material. Sand and gravel have been traditionally used for construction purposes, low cost building aggregate and road materials; beach replenishment or restoration should create a large demand for sand as beach erosion continues in the future. Sand and gravel retrieval will be limited by land use and availability of the resource to the site of use. As the demand for sand and gravel continues and the terrestrial sources are depleted or unattainable, the sand and gravel on the continental shelf will become more economical to mine.

Salt is another resource presently being exploited. Its distribution for exploitation is determined by man through construction of ponds into which ocean water is introduced for evaporation.

Authigenic phosphorite is a phosphorous-rich rock which is an important marine mineral that may prove to be economically valuable in the near future. Wilson and Mero (1966) indicate that phosphorite deposits are known to extend from coastal waters off Point Reyes north of San Francisco, southward 12,000 km (7,452 miles) to the mouth of the Gulf of Mexico. Phosphorite nodules found along the California coast may occur in some places within a few kilometers off the coast and extend as far from shore as the inner edge of the continental slope. The depth at which phosphorite exists ranges from 30 m to 2,500 m (100-8,200 feet). Since the origin of phosphorite may be associated with upwelling, we may extrapolate existing upwelling data as an indication of potential sites for submarine phosphorite formation.

Placer deposits are surficial mineral deposits formed by the mechanical concentration of mineral particles from weathered debris. Along the California coast, very few beach placers have been mined and possible offshore deposits have not yet been explored. Between Point Conception and the Oregon border, there are at least seven locations of mined placers. Surrounding these locations are offshore areas which are potential sources of placers. The most abundant of these minerals found in California waters are probably magnetite and ilmenite. Less abundant, but nonetheless commonly associated with these black sands, are gold and the platinum group metals, and many of the inert oxides and silicates such as chromite, rutile, zircon, monazite, uranoanorthite, garnet, and gemstones. Relatively insoluble sulfides such as cinnabar have also been recovered in small amounts from the beach placers of California.

Manganese nodules have been one of the more promising minerals found on the ocean floor. Manganese crusts have been dredged from the tops of seamounts offshore central California, and recently several metal nodules were dredged from the sea floor about 15 km (9.3 miles) off Monterey Bay. These nodules are presently being analyzed by the USGS.

Eel River. South of the Oregon border and north of Cape Mendocino there are several sand and coarse sand deposits; these deposits each cover an average area of 1 to 2 km². These deposits are in about 60 to 80 m (197 to 262 feet) of water and are probably remnant river deposits, deposited during Pleistocene lower sea level stand. Gravel deposits in this area are found almost exclusively around the Cape Mendocino area, in close proximity to rock outcrops. The average gravel deposit covers an area of about one-quarter square kilometer. Although no phosphorite deposits have been identified in the Eel River Basin, the presence of upwelling offshore of Eureka makes this area a potential phosphorite source area. Further research is needed to delineate phosphorite deposits and determine the quality and quantity of these deposits.

Black sand concentrations occur in beaches at quite a few other locations along the California coast, and many have been sampled or mined periodically in search for gold. Some amounts of gold have been recovered from beach sands in Humboldt County, particularly at Gold Bluff where occasional high values of gold and small amounts of platinum have been found with magnetite and chromite sands. Beach sands near the Oregon border in Del Norte County contain high concentrations of iron and chromium minerals.

Point Arena and Bodega Basin. South of Cape Mendocino to the Gulf of San Francisco, gravel deposits are only shown as small scattered deposits. This area has several scattered sand deposits, each covering an area of about one half square kilometer. South of Point Arena, coarse sand deposits start to appear; these deposits increase in size toward the south, each deposit covering about a quarter square kilometer in the north, with the largest deposit in the south found off Point Reyes covering an area of approximately 2 km². The sand and gravel deposits in this area are probably a function of both lower sea level and high energy dynamics.

Santa Cruz. Coarse sand and sand deposits are located offshore of the Santa Cruz region, though few have been identified within Santa Cruz basin proper.

In this region, salt is also a resource presently being exploited primarily in evaporative ponds in southern San Francisco Bay.

Scattered locations from Point Reyes to Monterey experience upwelling in offshore waters, a condition which, as indicated earlier, may appear to often accompany offshore phosphorite deposition. Uranium placers containing unusually large amounts of chromite are found along the

northern coast of California; and an extremely high-value sample of chromite was reported to have been taken from the beach in San Mateo County.

A beach deposit near Aptos, in Santa Cruz County, has been worked periodically for its titanium and iron content by several companies. These sands also contain magnetite, ilmenite, chromite, garnet, zircon and quartz. Jade is the only gem material known to occur in recoverable quantities in California beach deposits. Nephrite jade was discovered in the late 1930's along a 3-km stretch of coast in southern Monterey County, midway between Morro Bay and the City of Monterey. Some excellent quality nephrite has been collected on the narrow pebble beach in what has become known as the Jade Cove area.

Santa Maria. Extending from south of Monterey Bay to Point Conception, the most extensive gravel deposits (west of Big Sur) covers an area of a quarter square kilometer. The remainder of gravel deposits are of lower coverage. Coarse sand deposits decrease in size south of the Gulf of San Francisco and are non-existent south of San Simeon. The coarse sand deposits which are present in this area, each have an average coverage of about a quarter to a half square kilometer. The most prolific sedimentary deposits in this area, south of Monterey Bay, are the sand deposits. These deposits, which appear to be deltaic progradation existing in a high energy regime, each cover an average area of approximately 2 km² and are found west of Big Sur, Santa Maria, and Lompoc. The waters offshore from San Luis Obispo to Point Conception are characterized by upwelling and may be associated with phosphorite authogenesis.

iii. Geohazards (General): Instability of the sea floor whether from seismic activity or sedimentary processes, is recognized as the principal hazard to emplacement of platforms and pipelines in the marine environment. Hazards related directly to seismic activity include ground shaking, fault rupture, generation of tsunamis, and earthquake-induced ground failures such as liquefaction and slumping. Faults showing displacement of either the sea floor or young (less than 11,000 years) sediments as well as those associated with historical earthquakes are considered active and, therefore, potentially hazardous to development. Instability of the sea floor can also result from dynamic (e.g., wave surge) and static (e.g., gravity) forces acting independently of seismic activity. Some areas of the sea floor are prone to mass movement (e.g., slumps, slides) or other forms of sediment transport (flows, creep, or current scour). Submarine canyon walls and steep (greater than 10°) slopes, especially those with sediment cover, are considered to be hazardous. Oil and gas seeps, while not inherently hazardous, may provide clues to the location of fractured reservoir rocks and shallow over-pressured gas pockets that can pose a danger to drilling operations.

Other potential hazards along coastal California include mass wasting onshore (landslides, slumps, creep), ground surface erosion, onshore flooding, land subsidence, and expansive soils.

Hazards, as discussed above, pose a danger to pipelines (onshore and offshore), platforms, refineries and other oil and gas development support facilities. The conditions and processes of greatest concern are those that could result in a large oil spill and the attendant conditions that could delay control and cleanup or make them ineffective. The potential for damage from different kinds of natural events varies from area to area; thus, it is not possible to specify all possible conditions when dealing with geologic hazards and seismic conditions on a regional scale.

High seismicity characterizes all of the California coastal region. The hazardous effects of earthquakes include ground rupture and other failure modes such as liquifaction, slumping, differential settlement and land spreading. Shaking and tsunamis also must be considered in design of engineering operations. All tracts proposed for Sale No. 53 are subject to these hazards and constraints.

No particular fault or fault system can be ignored as a potential origin for a local earthquake unless it is demonstrably inactive and not a branch of one of the known or inferred major faults of the region. Movement along a fault plane penetrated by a well bore should be considered as having a potential for causing a major discharge of oil. Other damaging effects of an earthquake can be correlated with proximity to the zone of tectonic rupture, with the area and the length of time of relatively intense shaking between the rupture zone and the epicenter of the main shock, and with the boundaries between unconsolidated materials

and harder rocks. In general, the intensity of an earthquake diminishes with distance from the epicenter. Studies by Boore (in press) indicate a 50% decrease in ground acceleration 10 km from the epicenter.

The related earthquake shaking imposes extraneous loading and unloading upon fixed structures and tends to reduce structural integrity. Design criteria must require that offshore platforms have sufficient ductility to prevent collapse, yield, or buckling for the maximum level of earthquake activity which may be expected during the life of the structure.

Mass-wasting (slumping, landslide, liquefaction, etc.,) are naturally-occurring hazards in the OCS, and are known associative processes affected by earthquake shaking. Mass-wasting involves the "breaking away" and the bulk transfer of masses of debris (rock and sediment) downslope under the direct influence of gravity. There is a continuous series of types which grade from those which are imperceptibly slow (creep) to those which are rapid (slumps, slides), depending upon degree of slope, thickness, composition, and consolidation of material. Placement of structures on or near unstable, or potentially unstable areas could result in the rupture of well casing at shallow depths or damage to platforms and sea-floor completion structures. Unless unstable areas are avoided entirely, mass-movement should be considered a potential hazard toward the discharge of oil and gas and its consequential environmental impact.

Tsunamis (seismic sea waves) are produced by submarine earthquakes, or landsliding and slumping. They are infrequent and localized even in those areas where geologic conditions permit their formation. The magnitude of a submarine earthquake must be larger than 6.3 to generate a noticeable tsunami, and greater than 7.75 if a disastrous tsunami is to occur (Iida; 1958, 1963). Although portions of the northern and central California coast may be subject to tsunami inundation, the impact of such a phenomenon will generally be limited to onshore or near shore structures and tankers moored at fixed berths (For a more detailed discussion of tsunamis see III.A.1.b).

To assess the geohazards in each of the five basins considered in Lease Sale No. 53, studies have been undertaken by the U.S. Geological Survey. The results of their analyses forms the basis for the discussion to follow. Published reports of their findings should be available as U.S.G.S. open file reports this fall. Preliminary regional geohazard maps (Visual 10) were developed from historic data and field surveys conducted by the U.S. Geological Survey in 1979 and 1980 (Field et al. [in press]; McCulloch et al. [in prep]). Since that time, more detailed, site specific information has been provided (Richmond, et al. [in press]) and used to develop Figures III.A.1.a.iii-1 through III.A.1.a.iii-5).

Many of the potentially hazardous areas noted in the discussion to

SANTA MARIA BASIN

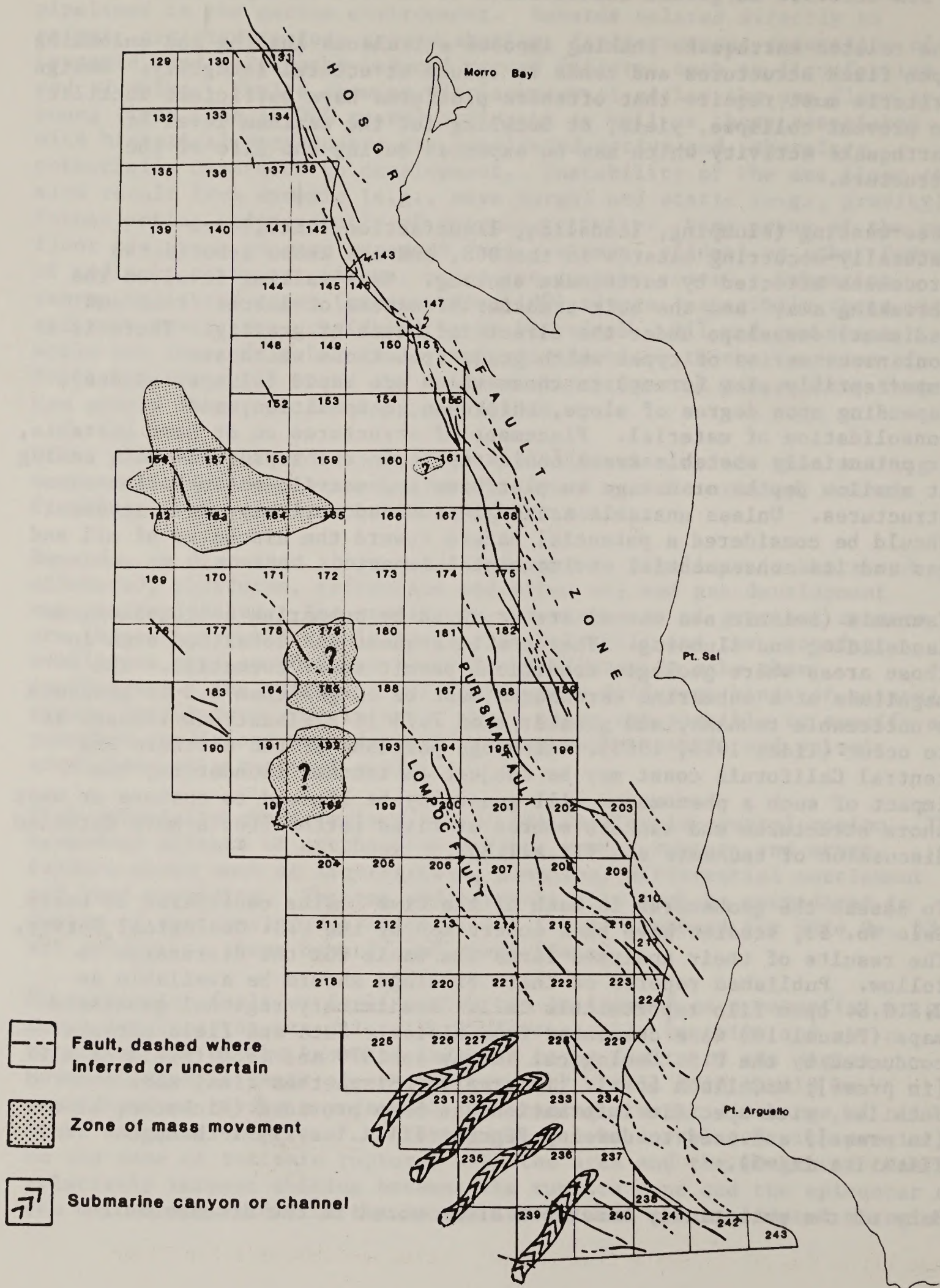


Figure III.A.1.a.iii-1 Santa Maria Basin: Faults and Unstable Sea Floor

SANTA CRUZ BASIN

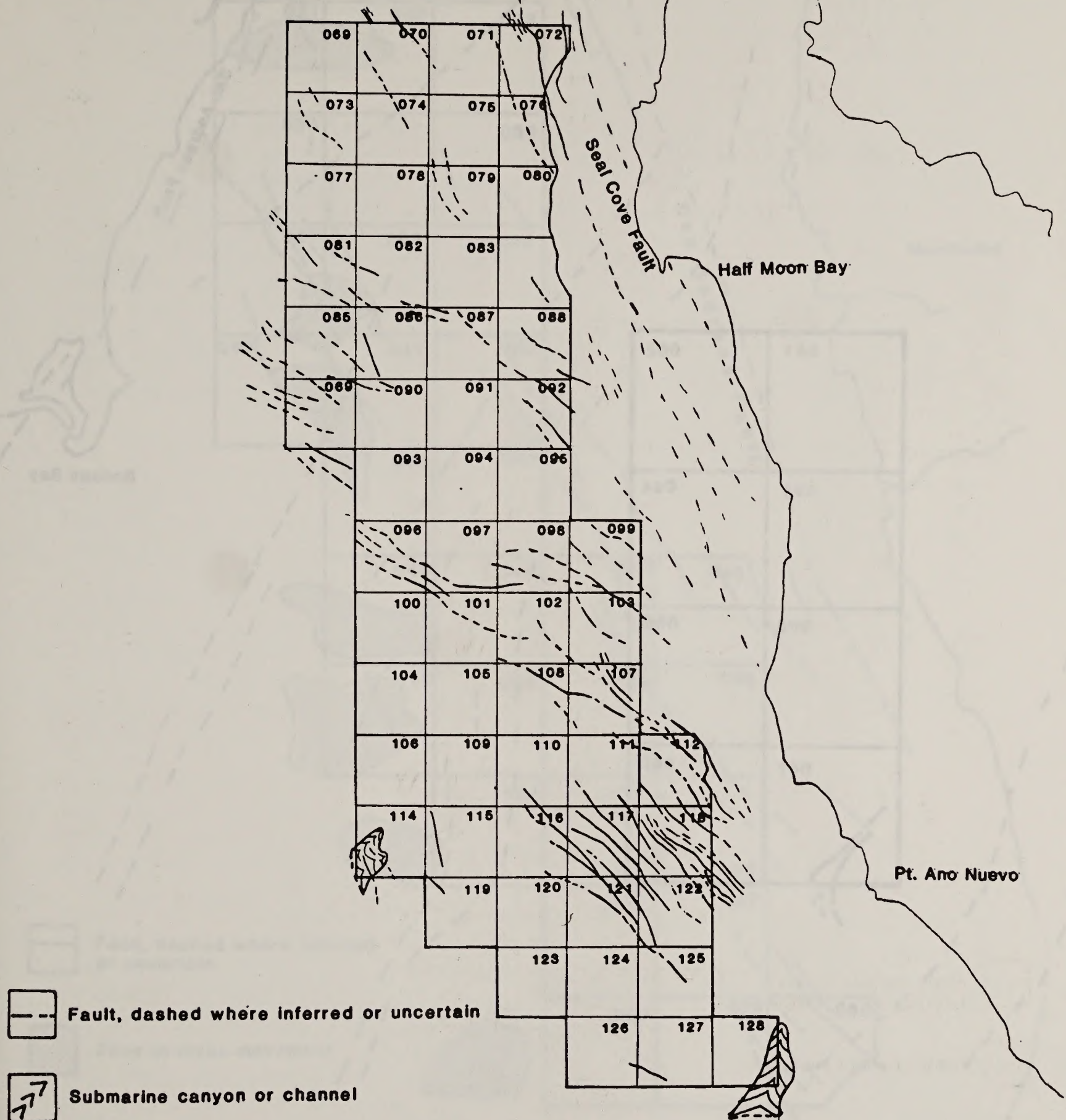


Figure III.A.1.a.iii-2 Santa Cruz Basin: Faults and Unstable Sea Floor

BODEGA BASIN

061	062
063	064
065	066
067	068

San Andreas Fault

Bodega Bay


 Fault, dashed where inferred or uncertain

Figure III.A.1.a.iii-3 Bodega Basin: Faults and Unstable Sea Floor

POINT ARENA BASIN

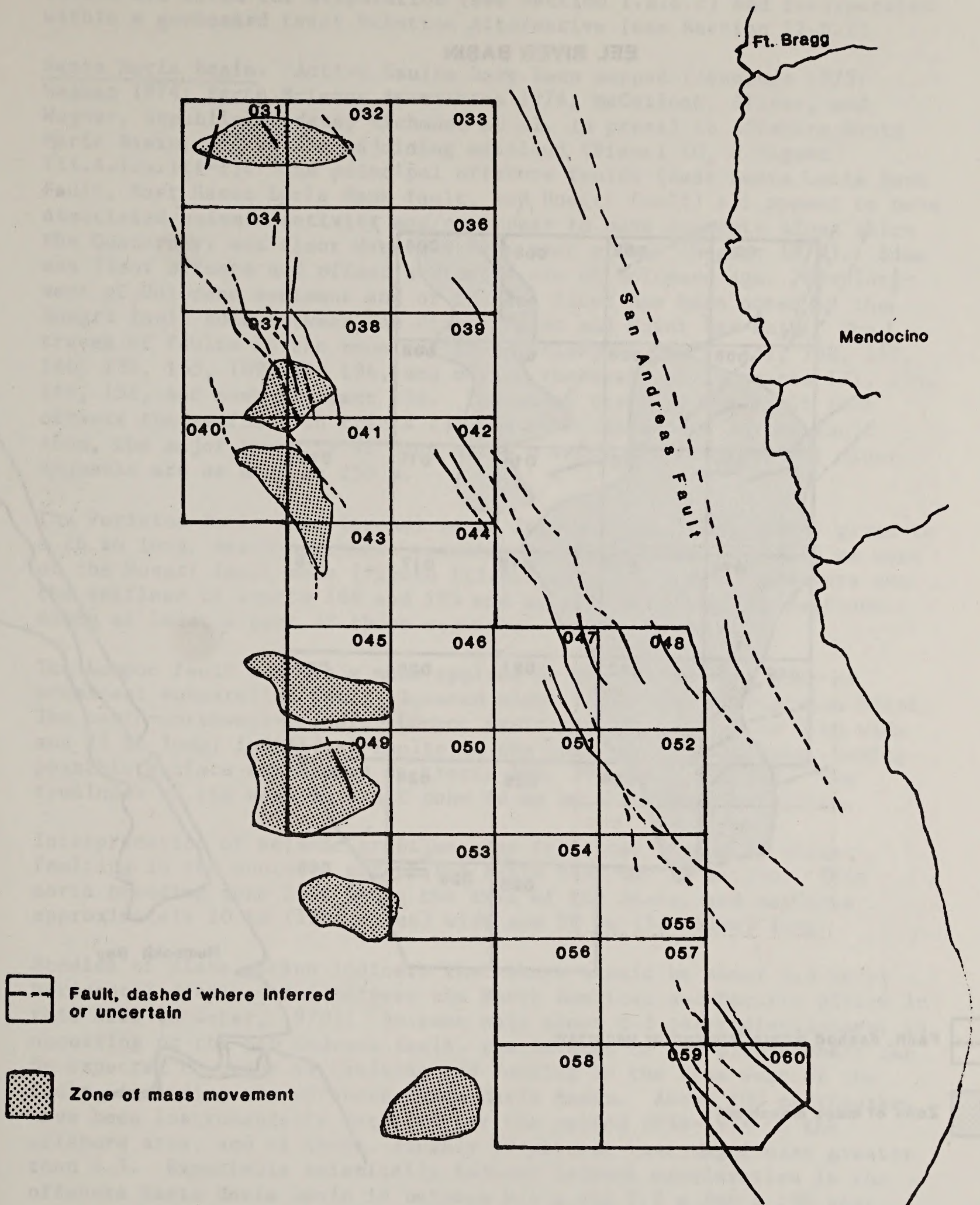


Figure III.A.1.a.iii-4 Point Arena Basin: Faults and Unstable Sea Floor

EEL RIVER BASIN

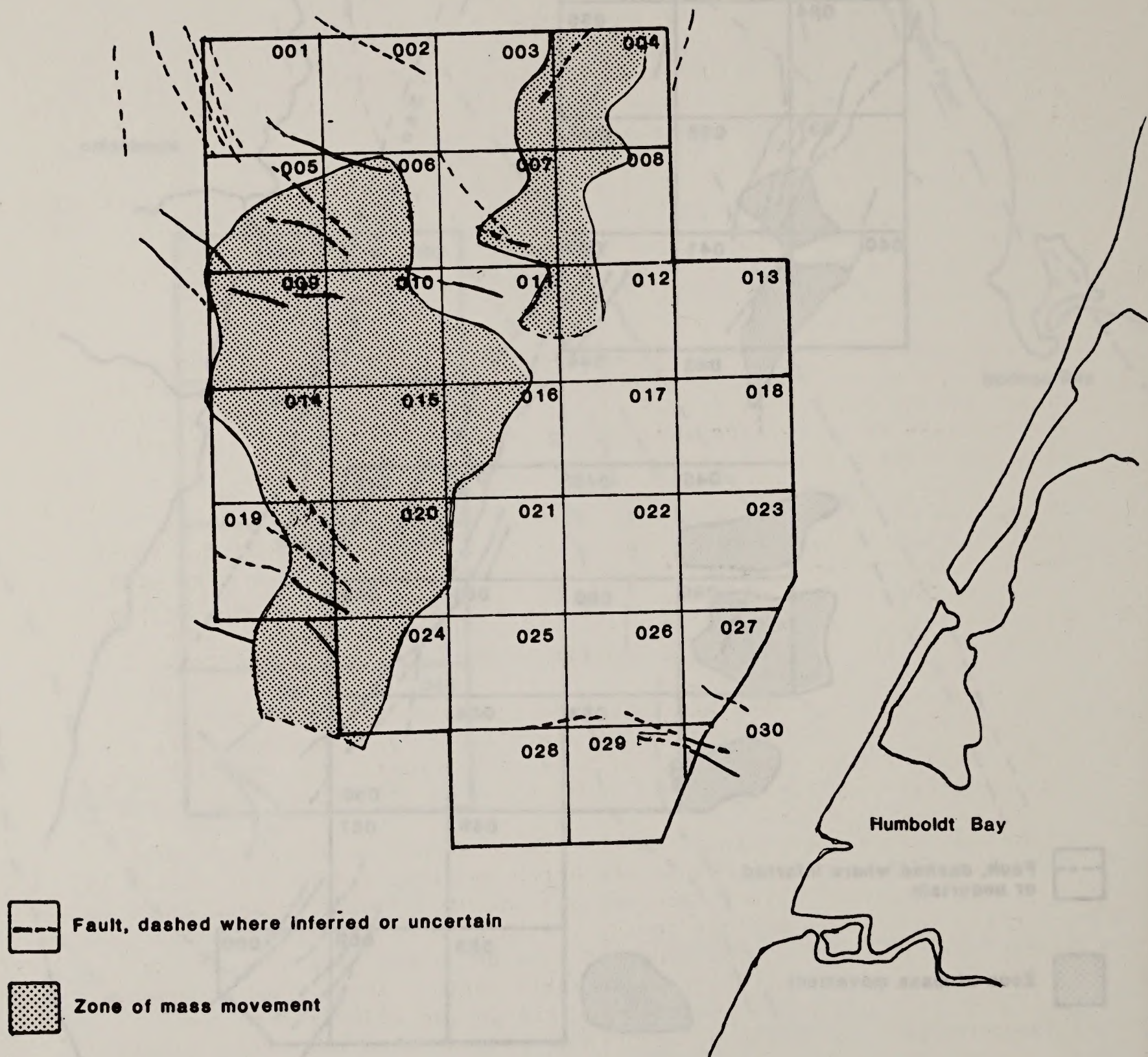


Figure III.A.1.a.iii-5 Eel River Basin: Faults and Unstable Sea Floor

follow are cited for stipulation (see Section I.B.6.c) and incorporated within a geohazard tract Deletion Alternative (see Section II.B.7).

Santa Maria Basin. Active faults have been mapped (Jennings 1975; Wagner 1974; Earth Science Associates 1974; McCulloch, Silver, and Wagner, unpublished data; Richmond et al. in press) in offshore Santa Maria Basin, and on the adjoining mainland (Visual 10, & Figure III.A.1.a.iii-1). The principal offshore faults (West Santa Lucia Bank fault, East Santa Lucia Bank fault, and Hosgri fault) all appear to have associated seismic activity and/or appear to have segments along which the Quaternary sea floor deposits have been offset (Wagner 1974). Some sea floor offsets and offset sediments are of Holocene age. Displacement of Holocene sediment and of the sea floor has been noted in the Hosgri fault zone between San Simeon Point and Point San Luis. The traces of faults in the zone cut the seafloor in tracts 131, 138, 142, 146, 151, 155, 189, and 196, and offset the seafloor in tracts 131, 134, 146, 151, and east of tract 134. The major trace in the fault zone offsets the seafloor in tracts 131 and 146. Elsewhere in the fault zone, the major trace is as deep as 30 m below the seafloor and minor segments are as deep as 250 m.

The Purisima fault zone (trend) is an informal name (ESA, 1974) given to a 26 km long, north-northwest-trending "disturbed zone" about 5 km west of the Hosgri fault zone (Figure III.A.1.a.iii-1). Fault segments cut the seafloor in tracts 188 and 195 and appear to offset the seafloor along at least a part of those segments.

The Lompoc fault zone is a name applied by ESA (1974) to a pair of prominent subparallel faults located about 17 km west of Purisima Point. The north-northwest-trending Lompoc fault zone is as much as 2 km wide and 25 km long; individual faults in the zone are 3-10 km long, having possible surface expression on tracts 194, 200, 201, and 207. The remainder of the western fault zone is as much as 200 m subbottom.

Interpretation of seismic profiles also indicates a zone of thrust faulting in the southern end of the Basin that may be active. This north trending zone lies along the axis of the Basin, and measures approximately 20 km (12.4 miles) wide and 50 km (31 miles) long.

Studies of plate motion indicate that there should be about 5.5 cm/yr horizontal displacement between the North American and Pacific plates in this area (Atwater, 1970). Because only about 2.5 cm/yr displacement is occurring on the San Andreas fault, the balance of the displacement can be expected to occur as faulting and folding in the area west of the fault, including the offshore Santa Maria Basin. About 100 earthquakes have been instrumentally recorded for the period 1934-1974 in the offshore area, and of these, roughly 10 percent have magnitudes greater than 4.5. Expectable seismically induced bedrock acceleration in the offshore Santa Maria basin is between 0.1 g and 0.2 g for a 100 year return, and approximately 0.6 g for a 2,500 year return (J. I. Ziony,

oral commun., 1979).

Four zones of mass movement are identified in the Santa Maria area. The sea floor in these areas is highly disrupted by chaotic slump topography, in contrast to its normal smooth surface. Unmodified slump toes on the sea floor and the absence of ponded young sediment in the topographic depressions indicate that these failures are active. The shallow failures are probably gravity-driven, perhaps initiated by earthquake activity.

A large zone, probably representing a single event or failure, is mapped in the west-central sale area (tracts 156-159 and 162-165). The zone is over 90 sq km in extent inside the Sale area and about 115 sq km overall. The depth of disturbance is less than 15 m thick over most of the zone but is a very thin surface feature (skin) in the southern three tracts (162, 163, and 164). The seafloor is hummocky over most of the zone.

Three questionable zones of mass movement, possible sediment creep or debris on the sea-floor, are mapped in the Sale area. One zone (tract 161), about 2.3 sq km in area, was identified on a single tract-line and is relatively insignificant. The other two zones, 41 and 43 sq km in area, are located in the west-central survey area (tracts 172, 173, 178, 179, 180, 185, 186, 191, 192, 193, 197, and 198). These two zones, characterized by a slightly hummocky and debris strewn surface, are highly questionable and show no, or very limited, subbottom disturbance. Side-scan sonographs show rubble on the seafloor over at least part of the two zones.

Submarine channels in the southern part of the survey area, which comprise the upper reaches of the Arguello Canyon system, cut at least part of 13 tracts. Unconsolidated sediments floor all of these channels and form at least a thin skin on the channel walls. Steep wall slopes, greater than 10° , are common in all of the channels (tracts 226, 227, 228, 231, 232, 233, 235, 236, 237, and 239) and slopes greater than 20° were measured in three tracts (233, 235, and 237). The combination of steep slopes and thin sediment cover suggests the possibility of unstable sediment masses on the channel walls (Richmond, et al. in press).

Outer Santa Cruz Basin. In Monterey Bay, at the south end of the basin, seismically active faults displace Holocene deposits and the modern sea floor (Greene, et al. 1973). These faults strike northwest obliquely toward, and terminate against, the seismically active San Gregorio-Palo Colorado fault.

Reconnaissance mapping has shown that most faults in the Santa Cruz sale area proper are in the highly deformed, older basinal sediments on the flanks of the buried Farallon-Pigeon Point High (Errata Sheet #1, Figure III.A.1.a.iii-2). Neogene-aged basin sediments, overlying the

older faulted rocks, are essentially unfaulted on the southwest flank, though on the northeast flank, several of the major faults in the older rocks do cut part of the Neogene section.

An unnamed northwest-trending fault zone in the northeast corner of the Sale area (tracts 072, 076, and 080) cuts the seafloor along at least a part of its trace. This fault zone which consists of 2-3 major traces, parallels and is probably related to the onshore San Gregorio and Seal Cove faults, 3-4 km to the east (Richmond et al. in press).

The Outer Santa Cruz basin is a seismically active area. Numerous faults are noted within this basin, and many of these faults show recent offsets. First motions indicate that the faults in the bay and the San Gregorio-Palo Colorado fault are moving with right lateral strike slip displacement. There are a few epicenters further offshore that lie along the margins of the outer Santa Cruz High, but their relation to possible faulting is not known. In addition, the San Andreas fault lies onshore approximately 20 km to the east of the Outer Santa Cruz basin and passes offshore 15 km to the northeast of the tracts to be offered in OCS Lease Sale 53. Maximum probable earthquake for this segment of the San Andreas fault zone is magnitude 8.3 (Smith, 1975). Expectable seismically induced bedrock acceleration in the Outer Santa Cruz basin is between 0.1 g and 0.2 g for a 100 year return, and approximately 0.6 g for a 2,500 year return (J. I. Ziony, oral commun., 1979).

Recent studies (Greene, unpublished data) indicate a general absence of slumps and slides in the outer Santa Cruz Basin. One exception is a small slump mass due west of Half Moon Bay (see Visual 10). A major submarine canyon, Ascension Canyon, is cut into the outer shelf and upper slope in tract 128. Wall slopes as steep as 12° are common in the canyon. A submarine canyon is also identified on tract 114.

Bodega Basin. Active faulting in the Bodega Basin is largely limited to its eastern margin south of Point Reyes, with faulting of undetermined age observed in the central and eastern portion of the Basin north of Point Reyes. Actually, in the Gulf of the Farallones just west of San Francisco, young faults displace Holocene deposits at the sea floor, but the redistribution of sea floor sediment is so rapid that displacement of the sea floor is minimal. These faults occur in a wide zone between the San Andreas and the fault-bounded structural high that lies along a possible northwestern extension of the San Gregorio-Palo Colorado fault. There are a few epicenters further offshore that lie along the margin of the Farallon-Pigeon Point High, but their relation to possible faulting is not known. In the sale area itself, a fault-bounded, northwest-trending graben was identified in the southwest quarter of tract 067 (Figure III.A.1.a.iii-3). The graben is 125-135 m below the seafloor with minor apparent offset (less than 5 m) and is not considered to present a hazard.

The estimated maximum probable earthquake for the San Andreas fault zone

(which forms the eastern boundary of the Bodega Basin) is magnitude 8.3 (Greensfelder 1974; Smith 1975). Seismically induced bedrock acceleration for the Bodega Basin is expected to be between 0.1 g and 0.2 g for a 100 year return and 0.6 g for a 2,500 year return (J. I. Ziony, oral communication 1979).

No slumps or slides have been recognized in the Bodega Basin south of Point Reyes where there is relatively good high resolution seismic profiling information. North of Point Reyes, sea floor instability of this sort is observed on the steeper slopes seaward beyond the shelf break (see Visual No. 10).

Point Arena Basin. Faulting has been identified along the eastern margin of the Point Arena Basin. Most faults in the Sale area are associated with north-northwest-trending buried basement ridges that approach but do not intersect the seafloor. These faults usually do not cut the Quaternary section and are restricted to the basement rocks. One fault in the northeast corner of tract 055 offsets the base of the Quaternary section about 30 m. Faults in basement rocks can be traced 1-14 km and range in depth from 10 to 389 m subbottom. Few faults are found in the relatively undeformed Neogene section. Those that are, range in length from 1 to 3 km and are found in tract 036, 037, 040, and 049. In general, the basin is not well covered by existing seismograph networks, and it is possible (as suggested by the relatively high proportion of $M > 4.5$ earthquakes reported) that smaller earthquakes that indicate not only activity but also possible location of active faults are not detected. The potential for strong ground motion over the entire Point Arena basin is great due to the proximity of the San Andreas fault-Mendocino fracture zone (McCulloch and others). The San Andreas fault zone is located 1-10 km east of the Sale area and trends N. 17 W. and is 1-6 km wide north of Point Arena (Curry, 1966). Expected seismically induced bedrock acceleration for the Point Arena basin may be greater than the 0.1 g to 0.2 g for a 100 year return and 0.6 g for a 2,500 year return estimated by J. I. Ziony (oral commun., 1979). In addition, several $M > 4.5$ earthquakes have occurred along the western edge of the Basin.

Submarine slides are sparse in the Point Arena area and are all found on the slope and on channel walls along the west margin of the Sale area (Figure III.A.1.a.iii-4). Seven slides were mapped in and adjacent to the Sale area, ranging in area from about 8 to 19 sq km. Three slides, tracts 031, 032, 053, and west of 058, are inferred based on a slightly irregular seafloor. The four slides in the west central Sale area (tracts 037, 038, 040, 041, 043, 045, and 049) are shallow surface features with the depth of disturbance less than 10 m. These slides are characterized by a slightly hummocky seafloor and slightly distorted internal reflectors.

High resolution seismic reflection profiles show possible gas concentrations in the shallow surface at the crest of the shelf-slope break

along much of the western margin of the Point Arena Basin (see Visual No. 10).

Eel River. Data indicates many of the ridges and knolls on the shelf in the Eel River Basin are shale diapirs in various stages of emplacement. If the process of diapirism is active at present, as suggested by seismic reflection data, then it poses an additional geologic hazard to be considered. Strata upbowed by piercement activity fail elastically by slumping and by faulting.

Numerous faults cut the rocks and sediments of Eel River Basin and adjacent terrain. Most of the faults in the Sale Area proper can be placed into one of two groups: 1) those along which diapiric structures were uplifted or emplaced (tracts 001, 002, 007, 025, 026, 029, and 030), or 2) those formed as the result of extension or thinning of the sediment cover over the tops of buried diapiric ment structures or upwarps (Figure III.A.1.a.iii-5; tracts 001, 005, 006, 007, 009, 010, 011, 014, 019, 020, 025, 026, 027, 029, and 030). Those faults associated with the growth of diapirs show large vertical displacement but could not be measured. They offset the seafloor on the flanks of upwarps just west of tract 001 and in tract 007. These faults are probably of Holocene age. Faults associated with an upwarping of the sediments in tract 025, 026, 027, and 029, and 030 are assumed to be older, ranging in depth from 30 to 140 m. Tensional faults above the trends of buried diapiric structures or upwarps (one in tracts 001, 005, 006, and 009 and one in tracts 014, 019, 020, and 024) show relatively little vertical offset, less than 5 m, and cut the seafloor in tract 019. The faults that cut the seafloor are Quaternary in age, but the age of the deeper faults is unknown.

The offshore area of northern California is considered to be one of the most seismically active in North America (Seeber and others, 1970). Within the general area of the Eel River Basin, over 250 earthquakes, 23 having magnitudes greater than 5 (Richter Scale), have occurred between 1853 and 1973. Two of these earthquakes, one of magnitude 4.9 and the other of magnitude 5.6, occurred in the southern portion of the Eel River basin on the shelf overlying the Eel Plateau (Bolt and others, 1968; Silver, 1974) in the area of the proposed tracts to be leased during OCS Lease Sale No. 53. The epicenters for these earthquakes are plotted in Visual No. 10. The trend over the past several decades indicate an average of at least one earthquake per year having a magnitude greater than 5.0 and at least one earthquake per decade having a magnitude greater than 6.0. Because of the proximity of the area to the subducting margin of the Gorda plate, an earthquake of 7.0 to 7.5 magnitude can be expected to occur offshore northern California at a depth of 40-50 km (25-31 miles) (Smith 1975). Expected bedrock acceleration for the Eel River basin is between 0.1 g and 0.2 g for a 100 year return and 0.6 g for a 2,500 year return. This is consistent with bedrock acceleration values for the rest of the northern and central California offshore areas (J. I. Ziony, oral commun., 1979).

Three major zones of slumping are present on the northern California continental margin. These areas are west of Crescent City, west of the Mad River and west of Eureka. Two zones of mass movement were mapped in the Sale area itself. The largest failure zone, about 175 sq km in area, is located on the west side of the Sale area and covers about 2.5 to 100 percent of tracts 005, 006, 009, 010, 011, 014, 015, 016, 019, 020, 021, and 024 (Figure III.A.1.a.iii-5). This zone consists of at least three coalescing slides. Several episodes of mass movement underlie the surface slides to a depth of about 200 m and extend 1-3 km beyond the boundaries of the surface slide. The most recent slides are less than 40 m thick along gently-dipping slip surfaces. Sea-floor topography over the slides is very chaotic and hummocky. The zone gradually dies out to the north (tracts 005 and 006) so that boundary is hard to define and is questionable as drawn.

The second zone of mass movement is located along the plateau slope in the northeast part of the Sale area (Figure III.A.1.a.iii-5; tracts 003, 004, 007, 008, 011, and 012). The entire zone (within the Sale area) is about 50 sq km in area and covers from 1.5 to 60 percent of the underlying tracts. At least four individual coalescing rotational slumps, 30 to 70 m thick, are identified but are not differentiated.

Associated with the large slump zones are areas identified as unstable sediment masses. These areas are characterized by sequences of unconsolidated sediment that lie on steep slopes or that show the effects of initiation of movement, such as rupture or bulging. Although many of the sediments in these areas show evidence of failure, there is no evidence of their translation or transport over significant distances. Nevertheless, these sediment units are apparently undergoing stress from multiple forces (gravity, uplift, currents, and fault rupture/seismicity) and there is a suggestion that they will fail, perhaps in the near future, in the form of slumps and slides.

Two large areas having possible accumulations of shallow gas were identified, one area on the shelf west of Crescent City and another off Eureka. The identification of these areas from available seismic reflection data is inconclusive. The presence of abnormal pressures, whether it be due to shallow or deeper gas formations had not been encountered by previous exploratory drilling in the Eel River Basin (Ziegler and Cassel 1978). However, the presence of abnormal pressures in onshore portions of this basin suggest similar conditions will be found within the offshore extension of this basin. Further detailed geophysical and geochemical studies are needed to verify the presence or absence of gas accumulations.

b. Physical and Chemical Oceanography: This section briefly summarizes the physical and chemical characteristics and some oceanographic forces found off central and northern California. For a more complete review of central and northern California physical and chemical oceanography, see Winzler and Kelly (1977), Hickey (1978), Jones and Stokes (1980), and Williams (1980, preliminary draft).

Oceanic Water Circulation and Water Mass Characterization. The ocean water adjacent to the California Coast is basically characterized by the southern flowing subarctic water of the California Current. The water mass of the California Current is modified by a deep (200 m) undercurrent that flows northwest from Baja California to north of Cape Mendocino. Additionally, the circulation pattern and water characteristic structure along the central and northern California coast fluctuate due to seasonal climatic changes.

The three distinct seasons or periods along the central and northern California Coast are: the oceanic period (July until the middle of November); the Davidson current period (mid November until the middle of February); and the upwelling period (mid February until the end of August). Figures III.A.1.b-1 and -2 show the California Current system during the oceanic period and Davidson period (redrawn from Schwartzlose and Reid 1972). The Oceanic period is the season when the California Current dominates the circulation pattern. The California Current is best described as a meandering, diffuse, southeastward flow, with short-term variations in speed. The average speed has been reported to be between 10 and 25 cm/sec, while the maximum speed has attained speeds of 50 cm/sec (Schwartzlose and Reid 1972). Although there is no true western edge to the California Current, it has been reported to extend 600 to 1,000 km offshore, and is found above 100 to 500 m. The southward flowing California Current transports low-temperature, low-salinity, high nutrient (high μM phosphate) and highly oxygenated (78 ml O_2/l) subarctic water (Wyllie and Lynn 1971; Thomas and Seibert 1974; CALCOFI 1963; Emery 1960).

The Davidson Countercurrent, which appears nearshore during the Davidson period, may be the surface expression of the northward flowing Equatorial water undercurrent. The Davidson Current develops in the winter when the winds are northward along the California Coast. The Davidson Current lies landward of the California Current and extends to approximately 80 km offshore with speeds measured between 16 and 47 cm/sec (Schwartzlose and Reid 1972; Schwartzlose 1963). The characteristics of the deep flowing Equatorial Pacific water that emerges to form the Davidson Current are warm, high-salinity, nutrient-rich ($<3 \mu\text{M}$ phosphate), and oxygen poor (to $<0.25 \text{ ml } \text{O}_2/\text{l}$) (Wyllie and Lynn 1971; Thomas and Seibert 1974; Emery 1960).

Coastal upwelling, present during the upwelling period, is part of a large scale oceanic process that takes place along the western edge of continents. The upwelling process is illustrated in Figure III.A.1.b-3

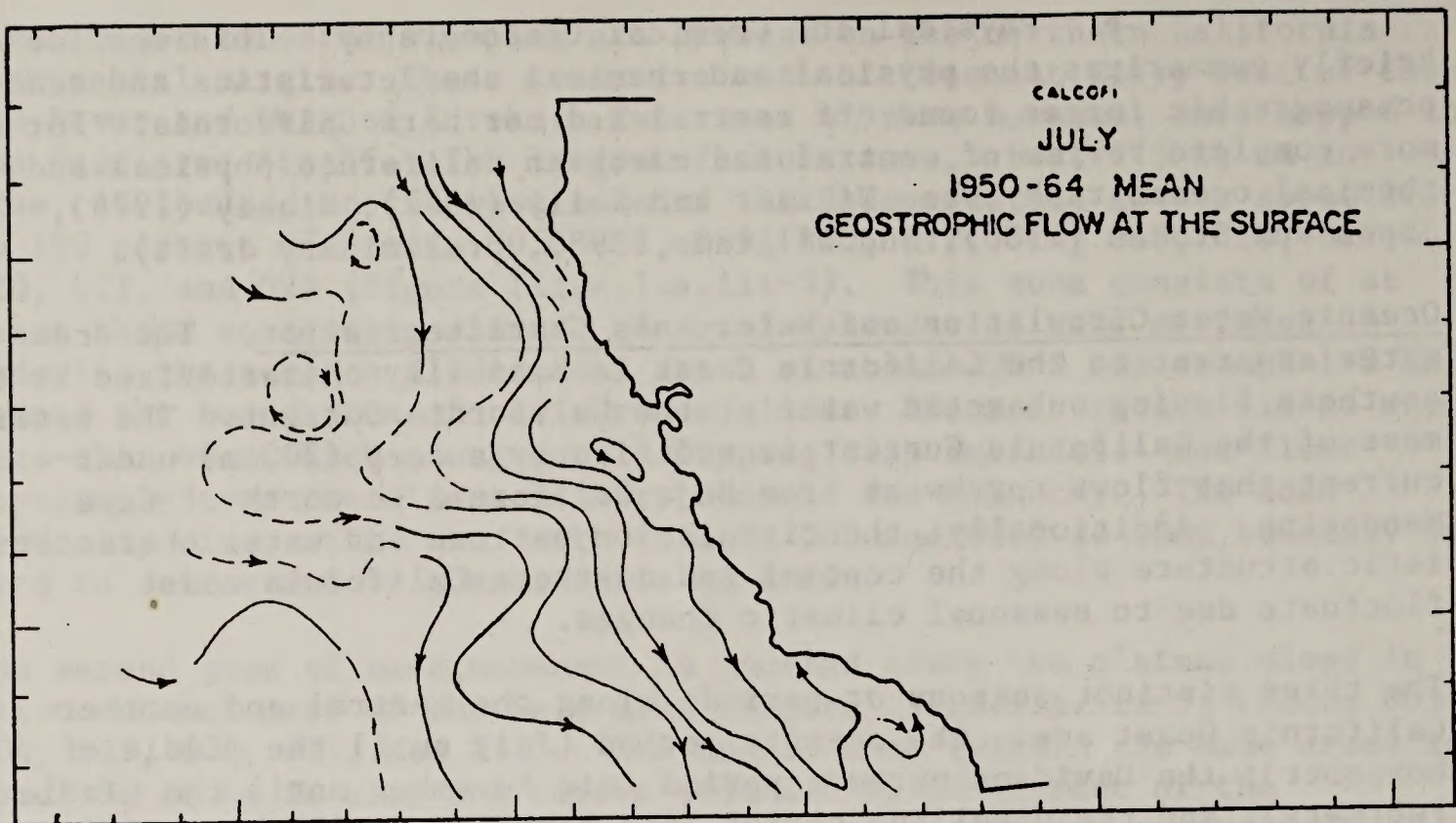


Figure III. A.1.b - 1 Mean July geostrophic flow (1950-1965) sea surface relative to the 500-decibar surface in dynamic meters (from Schwartzlose and Reid, 1972).

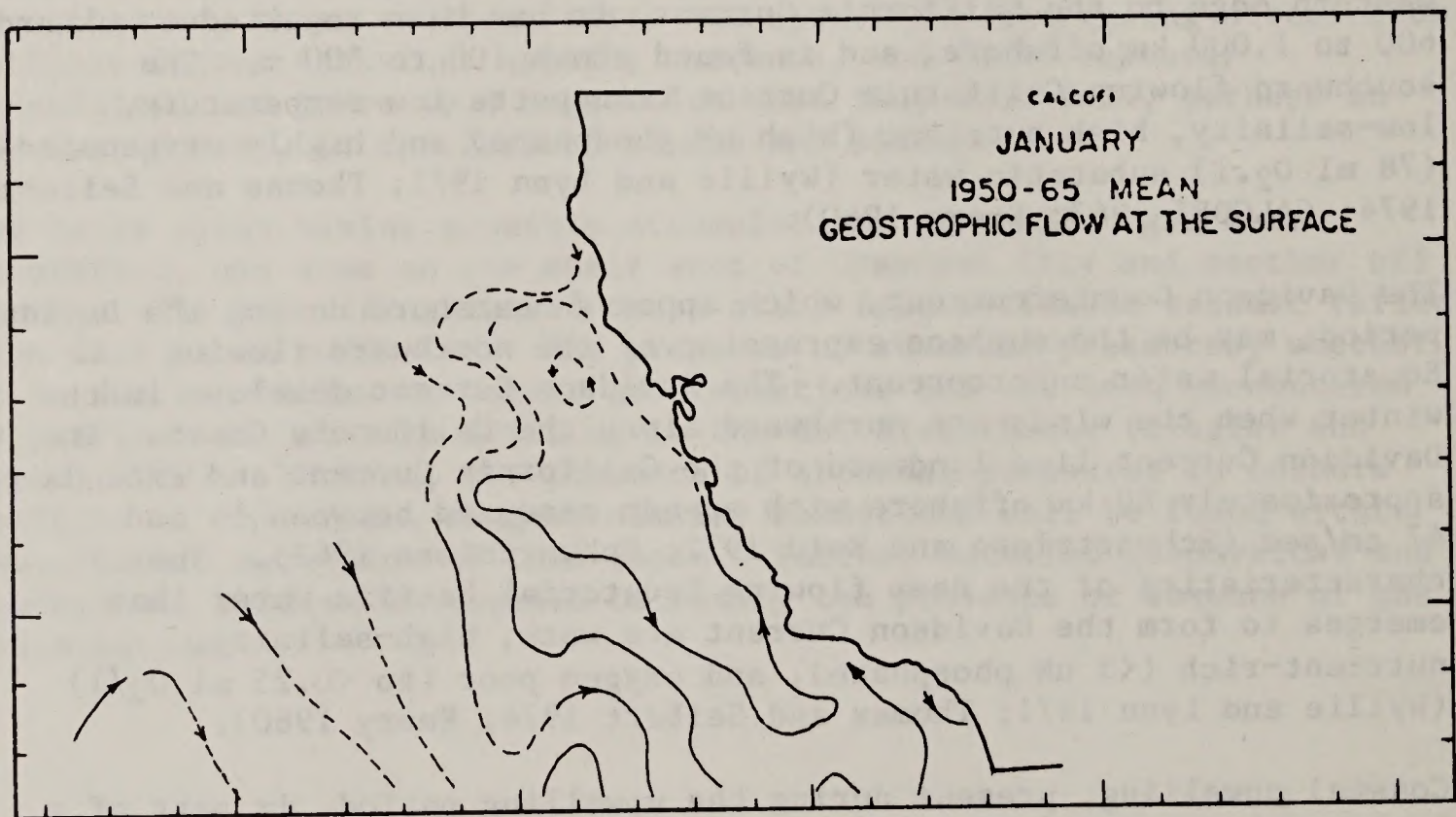


Figure III. A.1.b - 2 Mean January geostrophic flow (1950-1965) sea surface relative to the 500-decibar surface in dynamic meters (from Schwartzlose and Reid, 1972).

(adapted from sources indicated in figures). As the wind blows parallel to the coast in the direction of the current, surface layers of the ocean surface are transported offshore, and the deeper water moves to the surface (upwelling) replacing the water moved off shore. The upwelled water is usually low temperature, high salinity, and most importantly, nutrient-rich water; high in nitrates, phosphates, and silicates essential for high phytoplankton production in the surface layers of the ocean. The upwelling process, thus, acts as a conveyor of nutrients from the depths (generally less than 200 m in California), renewing the surface water and helping to bring about large phytoplankton blooms, rich zooplankton production and abundant fisheries production. Figure III.A.1.b-4 shows areas of upwelling along the central and northern California Coast.

Nearshore current data for most of the central and northern California coastline is lacking. Some information is available from the work of Conomos (1970) for San Francisco Bay and Squire (1969), Blaskovich (1973), Brown and Caldwell (1978), Broenkow and Smethie (1978), Carter (1967) and Dorman (1968) for Monterey Bay. Bourke (1977) and Pirie (1975) have done some nearshore current investigation for the area from the Oregon-California border to Cape Mendocino. Pirie, Murphy, Edmisten (1975) and Pirie and Steller (1975) provide some data on circulation patterns for Bolinas Bay and the area around Pt. Reyes.

Eel River Basin. Local eddies have been observed at Cape Mendocino, Trinidad Head and the jetties in Humboldt Bay. A large circulation gyre is located offshore of Pt. George and extends about 40 km to the south during the Oceanic Period (Pirie, et al. 1975). The Davidson Current sporadically surfaces inshore of the main California Current during the Davidson Period causing a small counterclockwise eddy off Humboldt Bay (Pirie, et al. 1975). However, tidal currents dominate at the mouth of Humboldt Bay when wind and river discharge are at a minimum. The Eel River Submarine Canyon is an upwelling locale. Longshore drift transports sediment north to south in spring, summer and fall and reverses during winter with the Davidson Period (Jones and Stokes 1980). The most intensive upwelling occurs in the area south of Cape Mendocino where it occurs most of the year.

Point Arena Basin. A small clockwise gyre has been observed in the area north of Pt. Arena and off Shelter Cove (Pirie, et al. 1975). During the Davidson Period, small counterclockwise gyres are located near Pt. Arena and Pt. Delgada. Upwelling occurs at Fort Bragg and Pt. Arena areas most of the year. The four submarine canyons which cut into the shelf in this basin create littoral drift cells with sediment transport primarily southward (Jones and Stokes 1980).

Bodega Ocean Basin. A gyre exists in outer Bodega Bay where it is clockwise during the Davidson Period and counterclockwise during the Oceanic Period. In the area of Duxbury Point to Drake's Bay, the water circulation is northwesterly meeting a counterclockwise current near

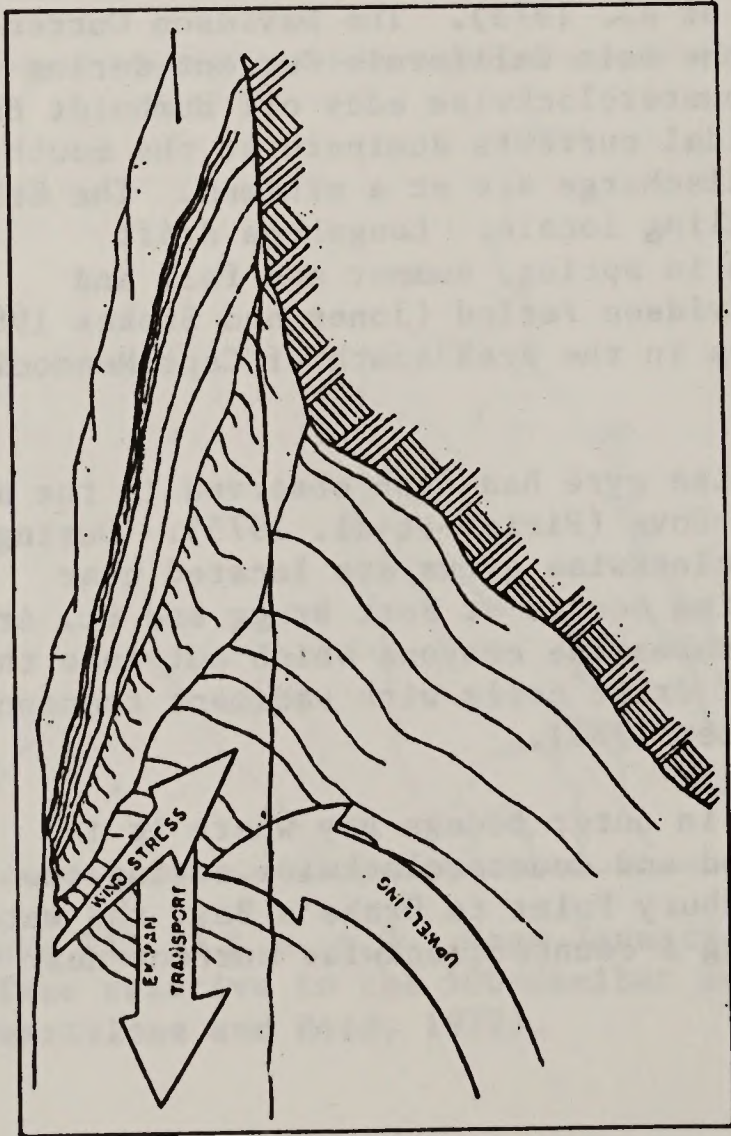


Figure III.A.1.b-3 A conceptual diagram of the coastal upwelling process. The coast of the continent is represented in cutaway view the ocean to the left of the figure. Offshore transport in the surface Ekman layer due to stress of the wind parallel to the coast on the sea surface is replaced by upwelling from depth.

Source: Bakun (1973)

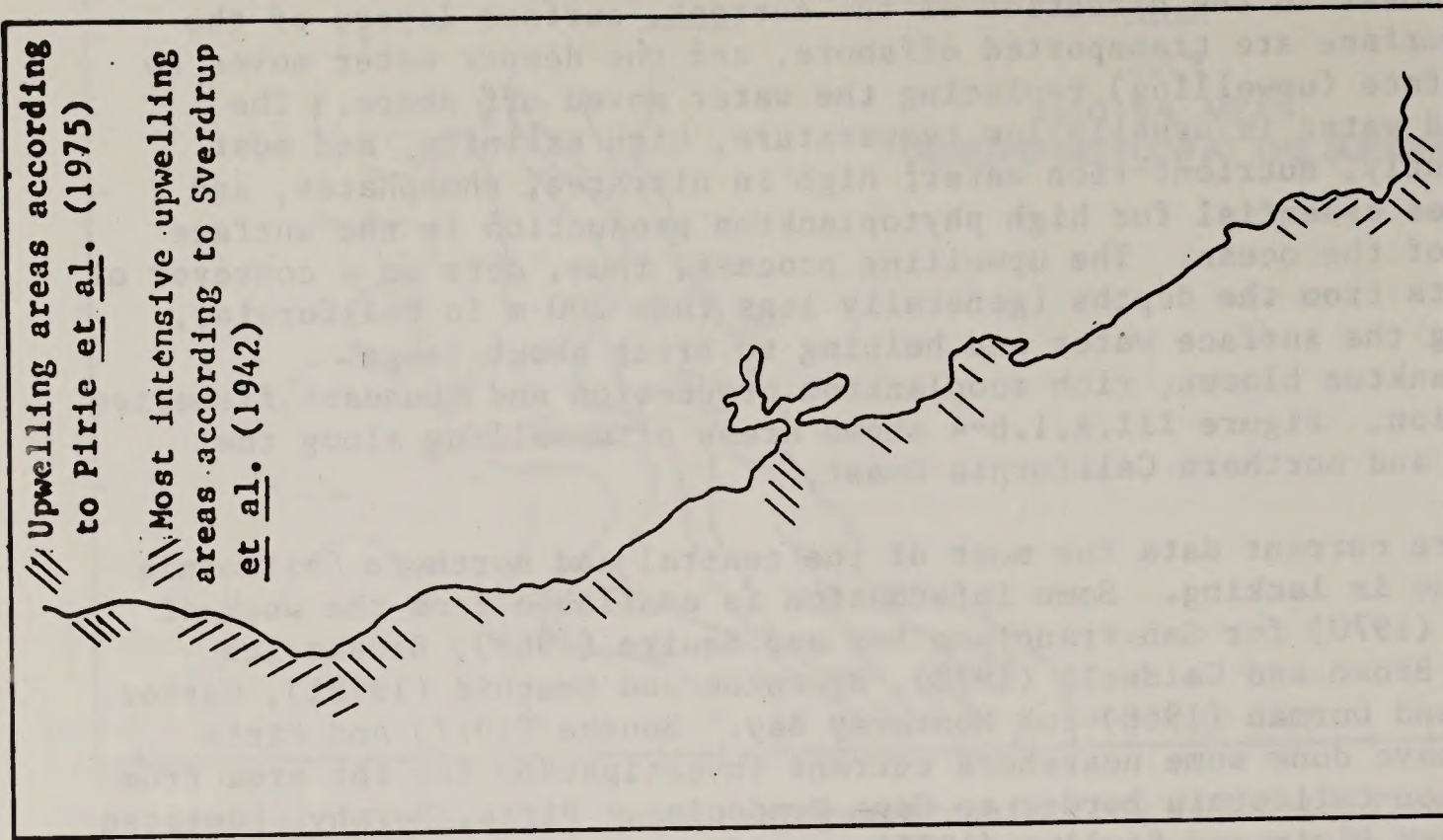


Figure III. A.1.b - 4 Major Upwelling Areas During Upwelling Season (February - July)

Drake's Bay. A counterclockwise gyre exists near Bolinas Bay where it is reinforced during storms and the Davidson Period (Pirie, Murphy, Edmisten 1975; Pirie and Steller 1975). A clockwise gyre exists in the area from Lake Merced to Duxbury Point off the Golden Gate where it is part of the Gulf of Farallons current cell. A small gyre exists off Pacifica. Littoral drift is primarily southward except for areas near Bodega Head, Point Reyes, and Duxbury Reef where northerly transport of sediments may be observed.

Santa Cruz Basin. The authors mentioned previously have investigated surface current trends in and around Monterey Bay and Santa Cruz. Gyres are present both in and outside the bay with seasonal variations influenced by offshore oceanic periods. Nearshore currents in Monterey Harbor are slow and weak and are dominated by tidal flow. The Monterey Submarine Canyon provides topographic effects which cause currents to flow up this canyon and then diverge to the north and south parallel to the coast. The submarine canyon is frequently an area of upwelling. Littoral drift moves sediments south into Monterey Bay and then down the Monterey Submarine Canyon. Some offshore transport occurs in the Carmel Submarine Canyon south of Monterey.

Santa Maria Basin. No good nearshore data were available for this area (Jones and Stokes 1980) except for some information on littoral drift. Sediments are transported south around Point Arguello and Point Sal and both north and south near Morro Bay.

Surface currents in central and northern California are primarily wind driven, leading to seasonal variability in patterns. Patterns noted in the basins above are based on rather short term studies in most cases or derived from a synthesis of observations from a variety of techniques. The numbers of observations are not equal for all methods employed and not equal among areas or among oceanic periods.

The long-term mean (13 years) temperature and salinity distribution from Lynn (1967) shows the influence of the currents and upwelling along the California Coast. The mean temperature, at 10 m, ranges from 10°C near Cape Mendocino to 14°C near Point Conception. The isotherms tend to parallel the coast along central and northern California, with the colder water inshore. The colder water is a mixture of cold subarctic waters from the north, and the cold water upwelled along the coast.

The long-term mean salinity (Lynn 1967) ranges from less than 33.00‰ near Cape Mendocino, to about 33.5 ‰ offshore Point Conception. Ocean waters increase in salinity moving from north to south, and are slightly more saline close to shore.

Oceanographic Physical Forces. Along the California Coast, storm surges (increase in general ocean height) are generated by weak tropical storms and by extratropical storms. For California, storm surges are relatively small with elevation of approximately 1 to 3 feet. Extreme

examples of storm surge are found along the Mississippi Coast where the surge has been approximately 25 feet.

Typical waves are those generated by storms with wind speeds which occur reasonably often but not by infrequent very severe extratropical storms. Typical wave conditions determine the planning for much offshore activity and therefore represent wave conditions most likely to be encountered during actual OCS operations. Typical waves represent an "average" condition for a given area. Data for typical waves was generated by hindcast methods for the period 1951 to 1974 by the U.S. Navy Fleet Numerical Weather Central (FNWC). Table III.A.1.b-2 gives the annual persistence of significant wave heights at three stations offshore California. Significant wave height is an average of the one-third highest waves in a wave record. Wave heights may be greatly increased by refraction. Wave periods are most often 6 sec to 12 sec with the longer period waves occurring off northern California during winter extratropical storms.

Wave statistics for the ten most severe storms affecting three selected stations offshore central and northern California, during the period 1951 through 1960, have been obtained by hindcast methods (National Marine Consultants 1960). Table III.A.1.b-1 summarizes the wave height data. Refraction of waves by the topographic features can result in localized concentration of wave energy with heights considerably in excess of those indicated in Table III.A.1.b-1.

Tsunamis or seismic sea waves are gravity waves which are associated with seismic disturbances. Tsunamis, of noticeable size in deep water (approximately 1 m), have periods of 8-55 minutes and lengths of 20 to 30 miles. Areas of highest seismic activity, which could potentially generate a tsunami, are the Aleutian trench area, the Gulf of Alaska, and the Kamchatka Peninsula. California Division of Mines and Geology (1972) show that damage from a tsunamis in California has almost always been greatest at Crescent City in Del Norte County, regardless of points of origin. The Division of Mines and Geology predict that tsunamis from distant sources will arrive on the average once every 20 years. Along most of the central and northern California Coast there is a moderate potential, with a high recurrence rate, for damage from high water and swift current resulting from tsunamis. Near Crescent City and Point Conception there is a high potential for damage from waves. At Crescent City, there is a high recurrence potential, while there is a low recurrence potential at Point Conception.

TABLE III.A.1.b-1

CHARACTERISTICS OF TEN MOST SEVERE STORMS
AFFECTING SELECTED STATIONS DURING PERIOD 1951-1960^a

Station ^b	1	2	3
Storm Date	Largest Significant Wave Height (ft.)		
12-51	26	20	18
12-52	22	20	16
1-53	20	21	20
2-54	23	21	18
3-56	20	20	15
2-58	20	19	18
4-58	20	24	26
11-58	21	21	20
2-59	20	23	20
2-60	32	34	33

^aFrom National Marine Consultants 1960.

^bStation locations as follows:

Station 1 42.0° N 125.0° W offshore California-Oregon border
 Station 2 39.6° N 124.5° W offshore Ft. Bragg, California
 Station 3 37.6° N 123.5° W offshore San Francisco, west of
 Farallon Islands

TABLE III.A.1.b-2

ANNUAL PERSISTENCE OF FAVORABLE AND UNFAVORABLE
SIGNIFICANT WAVE HEIGHTS

Average Duration (days) for Significant
Wave Heights Less Than

		<u>1 meter</u>	<u>3 meters</u>	<u>6 meters</u>
Station 1	Crescent City	3.0	17.5	193.4
Station 3	San Francisco	3.2	29.4	968.7
Station 6	Baja Calif.	2.8	22.8	Approaches infinity

Average Duration (days) for Significant
Wave Heights Greater Than

		<u>1 meter</u>	<u>3 meters</u>	<u>6 meters</u>
Station 1	Crescent City	3.9	1.7	1.3
Station 3	San Francisco	3.8	1.4	1.0
Station 6	Baja Calif.	5.9	1.4	approaches zero

c. Climate: Along the California coastline, from Point Conception to the Oregon Border, many local variations in climate are evident within the two major climatic groups (i.e., North Coast and Central Coast). More rain-bearing storms strike the coast in the northern section and occur over a longer period. Thus, annual precipitation ranges from about 45 inches at Fort Ross to about 20 inches at Point Conception. Mean annual temperatures range from the upper 50's in the north, to the lower 70's along the South Coast.

Wind flow during much of the year is from the northwest in nearly all of the offshore lease areas, except north of Cape Mendocino where the prevailing direction is northerly. These north and northwesterly flows are most dominant in the summer months. Wind speeds offshore, generally, decrease from north to south. Prevailing winds average 20 knots off the North Coast but average only 10 knots in the southern sections. Wind speeds are reduced greatly only a short distance inland due to coastal topography. For example, average wind speeds at Eureka are only 6 knots.

An inversion is defined as a layer in which the air temperature increases with height. Inversions are significant because pollutants are trapped beneath these layers. Inversions are present along the California Coast in summer nearly every day. Summer inversion heights are typically about 305 m (1,000 feet) in northern and central California coastal sections. These inversion conditions, combined with prevailing onshore flow, create a potential air pollution problem for coastal areas located downwind of major emission sources.

The primary restriction to visibility is fog. The North Coast, from Point Reyes to Eureka, experiences the most restricted visibilities during the summer. The incidence of low visibilities decreases further south, reaching a minimum on the central coast between San Luis Obispo and Monterey. South of San Luis Obispo the percent of time with poor visibility increases, again. The total frequency of visibility, less than 3 miles, ranges from about 15 percent of the time on the central coast to 30 percent of the time in some areas along the north coast.

Ambient Air Quality and Noise Levels. Air quality in a particular area depends upon the prevailing weather conditions, local topography, and the amount of pollutants being emitted into the air. Pollutant levels are measured by sampling or monitoring potential contaminants at selected locations. The State and Federal government have established levels of contaminants which should not be exceeded in order to protect public health and welfare (see Table 1, Appendix A). In California, the pollutants that frequently exceed these air quality standards are ozone (O_3), particulates (TSP), nitrogen dioxide (NO_2), sulfur dioxide (SO_2) and carbon monoxide (CO). Ozone, the most serious pollutant problem in California, is formed by the reaction of nitrogen oxides and hydrocarbons in the free atmosphere. The remaining pollutants are normally emitted directly into the atmosphere as a result of the combustion of

fossil fuels.

Under the Clean Air Act amendments of 1977, regions that exceed the air quality standards must develop an air pollution control plan so that the standards will be met by 1982. In March 1979, the California Air Resources Board officially designated areas that exceeded the Federal air quality standard based upon monitored data. Table III.A.1.c-1 shows these designations for coastal California counties. It can be seen that the heavily populated San Francisco, San Diego, and the South Coast Air Basin counties experience violations of many of the regulated pollutants. Of the coastal counties with sufficient monitoring data, only San Luis Obispo County meets the Federal oxidant standard. Preliminary data from the North Coast counties also indicates oxidant levels within the standards. In general, NO₂, SO₂, and CO violations occur only in urbanized counties. As might be expected, the higher pollution levels in urban locations can be directly attributed to the increased amount of pollutant emissions in these areas.

Oxidant levels are highest during the summer season owing to the more intense inversion, prevailing onshore wind flows, and warm sunlight to speed the reaction of nitrogen oxides and hydrocarbons into ozone. Locations downwind (inland) of major urban emission sources are most severely affected by ozone. Thus, even though cities such as Riverside and Livermore have relatively low emissions, they experience severe oxidant problems because of pollutants emitted in the nearby coastal sections. The reason for this phenomenon is that the oxidant formation process takes several hours to occur and by the time the reaction takes place pollutants have been transmitted downwind. Other gaseous pollutants such as CO and SO₂ are generally restricted to the region surrounding major emission sources.

Air quality in the coastal zone is regulated by local air pollution control agencies, the California Air Resources Board (CARB) and the Federal Environmental Protection Agency (EPA). In general, local agencies are responsible for regulating stationary sources while CARB regulates mobile sources as well as provides technical advice to the local jurisdictions. The EPA works closely with the State and local agencies to ensure that Federal air pollution standards and regulations are met. In California, the State and local regulations are usually more stringent than those promulgated by the EPA. Outer Continental Shelf (OCS) emissions are regulated by the Department of the Interior, USGS. OCS air quality regulations are discussed in Chapter I. Since OCS activities must be consistent with local coastal zone management plans, pertinent State and local regulations are also discussed in Chapter I.

Noise. Most of the region, immediately onshore from the proposed lease blocks, are sparsely populated with little industry. At most shoreline locations the predominant sounds are associated with wind noise, ocean surf, and infrequent vehicular traffic. Depending upon wind and sea

TABLE III.A.1.c-1

EXISTING AIR QUALITY

Region	Pollutant				
	O ₃	TSP	NO ₂	SO ₂	CO
<u>North Coast Air Basin</u>					
Del Norte County	U	B	U	U	U
Humboldt County	U	B	U	U	U
Mendocino County	U	E	U	U	U
Sonoma County	U	B	U	U	U
Trinity County	U	B	U	U	U
<u>San Francisco Bay Area</u>					
Marin County	E	B	B	B	E
Sonoma County	E	B	B	B	E
San Mateo County	E	B	B	B	E
Santa Clara County	E	B	B	B	E
Alameda County	E	E	B	B	E
<u>North Central Coast Air Basin</u>					
Monterey County	E	B	B	U	B
Santa Cruz County	E	B	B	U	U
<u>South Central Coast Air Basin</u>					
San Luis Obispo County	B*	U	B	U	B
Santa Barbara County	E	B	U	U	B
Ventura County	E	E	B	B	B
Channel Islands	U	U	U	U	U
<u>South Coast Air Basin</u>					
Los Angeles County	E	E	E	B	E
Orange County	E	E	E	B	E
<u>San Diego Air Basin</u>					
(San Diego County)	E	E	E	B	E

E - exceeds Federal air quality standards

B - better than Federal standards

U - unclassifiable - insufficient data

*Exceeds State of California O₃ standard.

conditions, ambient noise levels at shoreline typically range between 40 and 60 decibels (dBA) and may approach 30 dBA during calm periods. Even though these sound levels are nearly the same as those experienced in suburban areas, many persons find "natural sounds" more esthetically pleasing than man-made sounds of the same level. Urban and industrial areas, by comparison, experience noise levels of approximately 70 dBA.

d. Water Quality: Water Quality is the degree which chemical concentrations and physical parameters within a water mass approaches the ambient or natural water condition. Good water quality provides a healthy environment for biota. State and Federal regulations and guidelines have been developed to ensure the highest level of water quality. They are discussed by Miller and McGrew (1977).

The purpose of this section is to briefly discuss the existing water quality of the marine waters along central and northern California (Point Conception to the Oregon Border). Although little water quality information exists for the marine waters along central and northern California, Miller and McGrew (1977) have summarized existing information. For detailed information, Miller and McGrew's report should be reviewed directly.

Water quality is dependent upon a number of local factors: currents, freshwater inflow, the number and nature of ocean discharges, outfalls, and human activities. Human activities that affect oceanic waters are: discharge of municipal and industrial wastes, cooling water discharges, runoff, accidental oil spillage, dredging, and vessel wastes.

Overall, the oceanic water quality along central and northern California appears to be very good. The exception to the generally high water quality is found in the areas adjacent to centers of population and in some harbors and embayments.

The water quality and source of pollutants for 13 embayments and sloughs along the central and northern California Coast are discussed by Miller and McGrew (1977). San Francisco Bay has particularly poor water quality. This poor water quality is additionally degrading the quality of the adjacent oceanic water. From the investigation of the embayments and sloughs along the Coast, summarized in Table III.A.1.d-1, 50 percent of the sites investigated were found to have degraded water quality. In general, sewage appears to be the main cause for the poor water quality in many of the water bodies. San Francisco Bay water quality, however, is additionally degraded by industrial and commercial activity.

Determination of water quality along this section of the coast was based upon reliable water column and mussel analyses. The mussel (Mytilus sp.) is used as an indicator of pollution because of the mussel's ability to concentrate pollutants above ambient seawater levels and integrate the pollutant exposure over time. Through the State and national mussel watch program and BLM's Southern California Baseline program, mussels (Mytilus sp.) from the California Coast were analyzed for selected trace metals (Moss Landing Marine Laboratories) and hydrocarbons (Bodega Bay Marine Laboratory). Stephenson, Martin and Martin (1978) point out that three metals, lead (Pb), silver (Ag), and zinc (Zn), analyzed for in the mussel program, were found to reflect anthropogenic input. The geographical variation of these metal concentration (Figures III.A.1.d-1 through 3) shows that there is an

TABLE III.A.1.d-1

CENTRAL AND NORTHERN CALIFORNIA EMBAYMENTS
AND SLOUGHS^a WATER QUALITY

<u>Location</u>	<u>Water Quality Comment</u>
1. San Luis Obispo Bay	Good water quality.
2. Estero and Morro Bay	Elevated coliform concentrations due to stormwater runoff from dairy operations.
3. Carmel Bay	Good water quality.
4. Monterey Bay	Water quality in various areas of Monterey Bay is degraded due to discharged sewage effluent.
5. Moss Landing Harbor/ Elkhorn Slough	Water quality has been degraded by discharge from dairy operations, treated domestic sewage, and industrial (PG&E) power plant and a magnesia refractory concerns.
6. Half Moon Bay	No significant water quality problems.
7. San Francisco Bay	In general, poor water quality is found throughout San Francisco Bay. Water quality problems are due to heavy metals, hydrocarbons, high coliform levels, and depressed dissolved oxygen levels.
8. Bolinas Lagoon	Water and shellfish within the lagoon have been affected by septic tank seepage for a number of years.
9. Drake's Bay and Estero Bay	Excellent water quality.
10. Tomales Bay	Good water quality.
11. Bodega Bay and Harbor	Water quality is generally good, with the exception of bacterial contamination of both the water and the shellfish.
12. Humboldt Bay	Bacterial contamination of the waters and shellfish of Humboldt Bay has long been a water quality problem. Additional causes of water quality impairment in the Bay include vessel wastes, industrial wastes from timber products and fish processing industries, oil spills, and power plant (PG&E) cooling water and periodic cleaning waste discharge.

^aStephenson, Martin and Martin 1978.

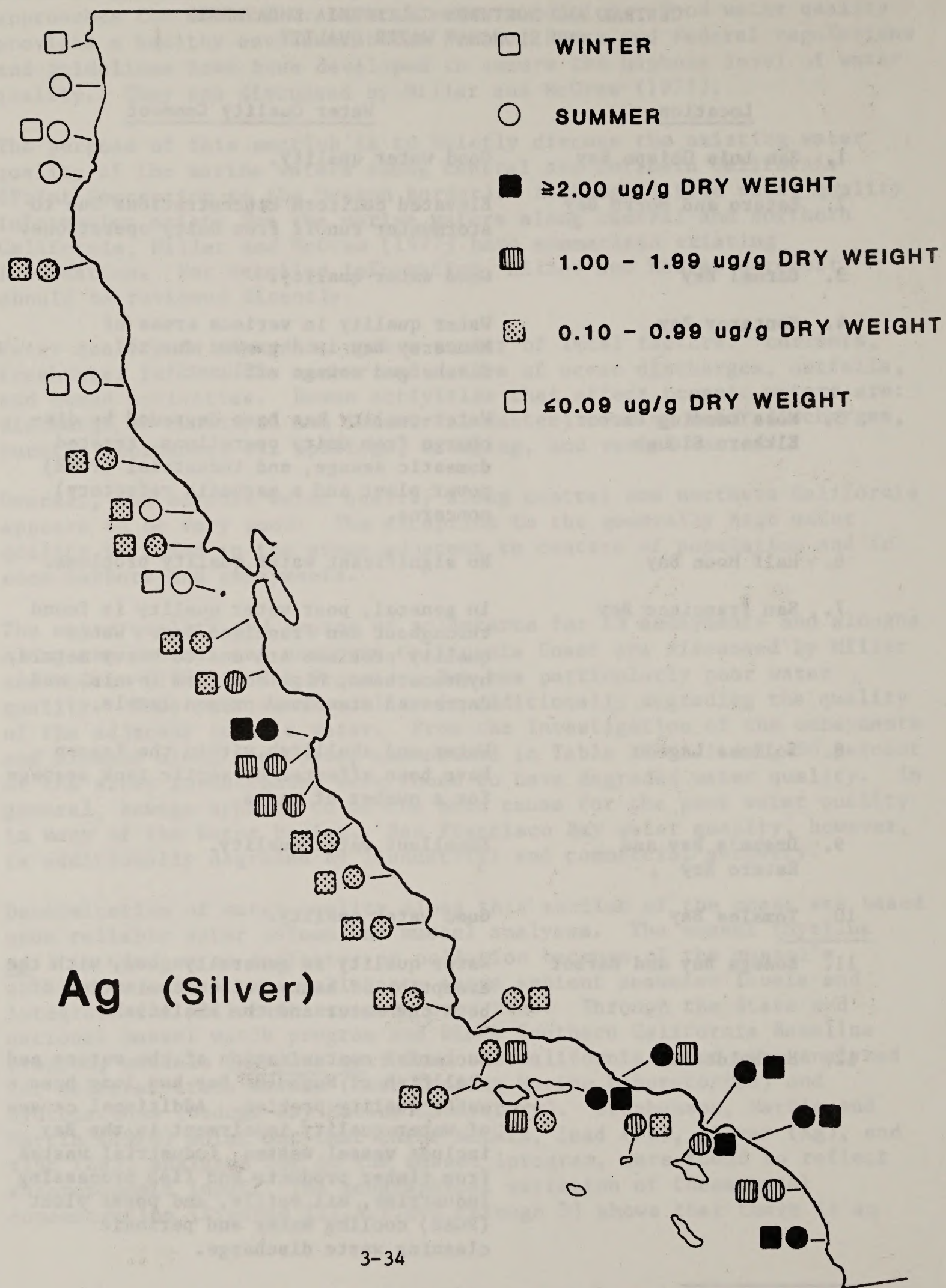
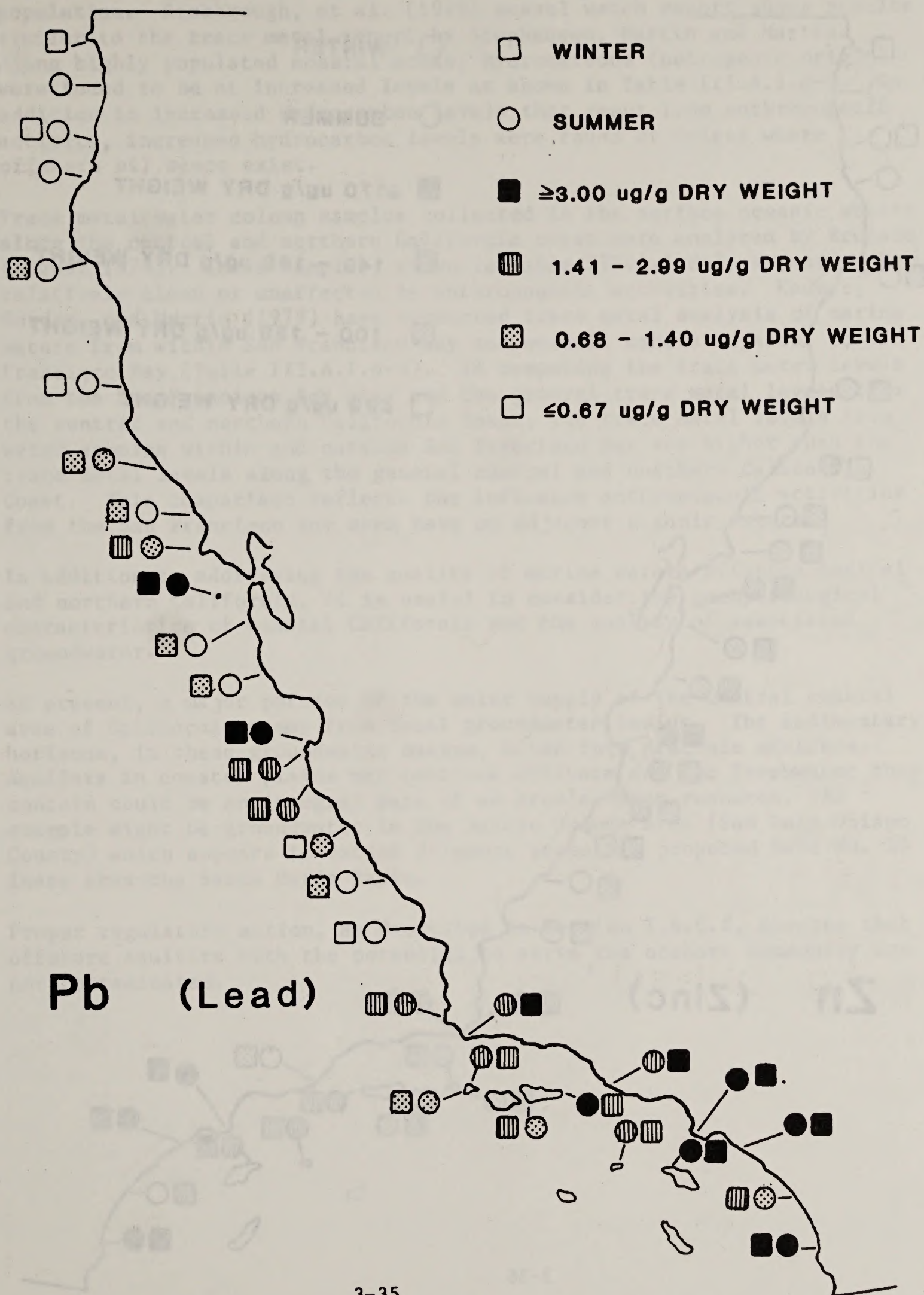
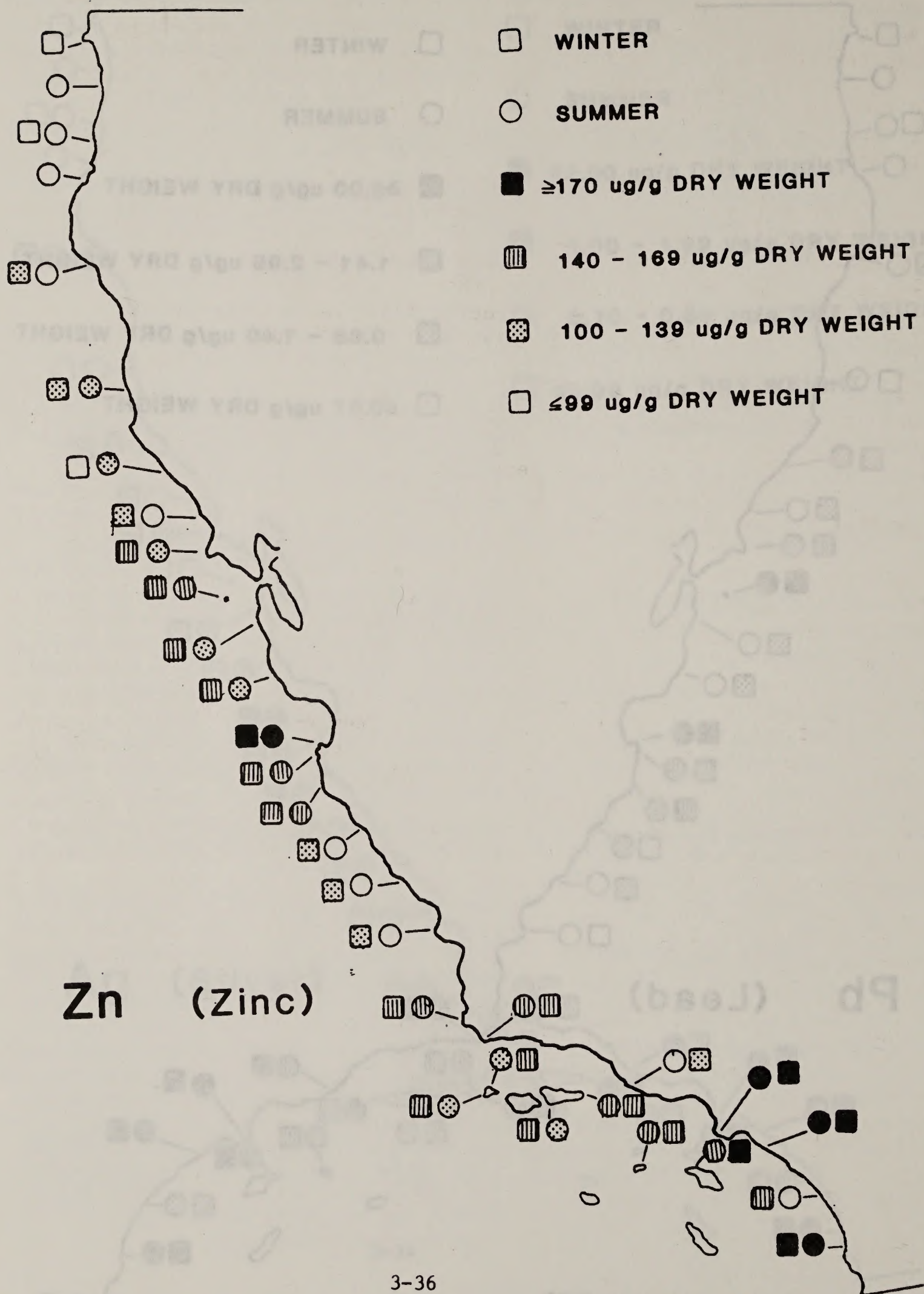


Figure III.A.1.d-1 Geographical Silver Metal Concentrations in the California Mussel (*Mytilus* sp.) from Selected Intertidal Areas Along the California Coast (Stephenson, Martin and Martin 1978).



3-35

Figure III.A.1.d-2 Geographical Lead Metal Concentrations in the California Mussel (*Mytilus* sp.) from Selected Intertidal Areas Along the California Coast (Stephenson, Martin and Martin 1978).



3-36

Figure III.A.1.d-3 Geographical Zinc Concentrations in the California Mussel (*Mytilus* sp.) from Selected Intertidal Areas Along the California Coast (Stephenson, Martin and Martin 1978).

overall increase in metal concentration toward the south; also, higher concentrations of metals are found adjacent to centers of high population. Risebrough, et al. (1978) mussel watch report shows results similar to the trace metal report by Stephenson, Martin and Martin. Along highly populated coastal areas, hydrocarbons (petrogenic origin) were found to be at increased levels as shown in Table III.A.1.d-2. In addition to increased hydrocarbon levels that result from anthropogenic activity, increased hydrocarbon levels were found at Goleta where offshore oil seeps exist.

Trace metal water column samples collected in the surface oceanic waters along the central and northern California coast were analyzed by Bruland (August 1979). These samples, shown in Table III.A.1.d-3, appear to be relatively clean or unaffected by anthropogenic activities. Kauner, Gordon, and Martin (1979) have conducted trace metal analysis of marine waters from within San Francisco Bay and oceanic waters adjacent to San Francisco Bay (Table III.A.1.d-4). In comparing the trace metal levels from the San Francisco Bay area and the general trace metal levels from the central and northern California Coast, the trace metal levels from water samples within and outside San Francisco Bay are higher than the trace metal levels along the general central and northern California Coast. This comparison reflects the influence anthropogenic activities from the San Francisco Bay area have on adjacent oceanic waters.

In addition to addressing the quality of marine waters offshore central and northern California, it is useful to consider the geohydrological characteristics of coastal California and the quality of associated groundwater.

At present, a major portion of the water supply of the central coastal area of California comes from local groundwater basins. The sedimentary horizons, in these groundwater basins, often form discrete aquifers. Aquifers in coastal plains may continue offshore and the freshwater they contain could be an integral part of an area's water resource. An example might be groundwater in the Arroyo Grande Area (San Luis Obispo County) which appears to extend offshore beneath a proposed Sale No. 53 lease area-the Santa Maria Basin.

Proper regulatory action, as described in Section I.B.6.f, assures that offshore aquifers with the potential to serve the onshore community are not contaminated.

TABLE III.A.1.d-2

MUSSEL (MYTILUS SP.) HYDROCARBON CONCENTRATIONS FROM
SELECTED SITES ALONG THE CALIFORNIA COAST

Location	N ^b	Concentration (ug/g Dry Wt.)
So. California Islands	14	12 ± 4
San Diego Harbor	1	220
Los Angeles Harbor	1	270
Goleta	4	440 ± 230
South Shore (Pt. Conception to La Jolla except harbors)	12	64 ± 68
Morro Bay	1	28
Central Coast (Excluding Pacific Grove) Pt. Argello to Farralon Islands	16	9 ± 4
Pacific Grove	2	15 ± 15
Elkhorn Slough	1	49
San Francisco Bay	1	180
Tomaes Bay	1	10
Humboldt	3	96 ± 6
Northern California Coast ^a	16	9 ± 4

^aPoint Reyes to Redwood del Norte.

^bN = No. of samples (1 sample = 20 individuals).

Source: Risebrough, personal communication August 1979.
(R. W. Risebrough, et al., 1979)

TABLE III.A.1.d-3

TRACE METAL LEVELS FOR SURFACE OCEANIC WATERS
ALONG CENTRAL AND NORTHERN CALIFORNIA

Metal	Concentration (ng/kg)
Manganese (Mn)	100 - 300
Nickle (Ni)	200 (approximately)
Cadmium (Cd)	4 - 25
Lead (Pb)	5 - 15
Zinc (Zn)	5 - 30
Copper (Cu)	100 (approximately)

Note: The trace metal information for the general area of central and northern California was taken from surface water outside the influence of ocean waste discharges.

Source: Bruland, personal communication August 1979.

TABLE III.A.1.d-4

TRACE METAL LEVELS FOR SURFACE WATERS
WITHIN AND OUTSIDE SAN FRANCISCO BAY

Location	San Pablo Bay	Alcatraz	Just Outside S.F. Bay	Farallons	General Area Around Proposed San Francisco Municipal Outfall
Metal (ng/l)					
Manganese (mn)	5310	7620	5770	851	309-2400
Nickle (Ni)	2040	1210	913	322	235-591
Lead (Pb)	10	42	203	20	20-63
Zinc (Zn)	804	524	330	43	64-358
Copper (Cu)	1880	846	696	136	81-330
Cadmium (Cd)	50	48	48	26	27-46

Note: Samples taken from surface waters (0-10 m) using Chelex extraction techniques for all metals except copper. Organic extraction was used for copper samples.

Source: Kauner, Gordon and Martin, personal communication August 1979.

2. Biological Environment

a. Biological Oceanography

Plankton. The source of references for plankton came from Riznyk (1977) and Holton, Leatham and Crandell (1977).

The greatest significance of the phytoplankton lies in the role they play within the ecosystem. As primary producers, they convert inorganic carbon and water into complex organic compounds by the process of photosynthesis. Within the euphotic zone, light energy is captured by the chlorophyll and accessory pigments and converted into chemical bond energy which is then available for the plankton's metabolism or for the metabolism of the organisms of higher trophic levels. Plankton fluctuate spatially and temporally, and vary with the turbidity of the water column.

The nature of the planktonic habitat, in which water movements control the position of the organisms in the medium, illustrates the importance of circulation. Horizontal surface currents carry plankton from one region to another and can result in changes of community structure when component species encounter either more favorable or less favorable environmental conditions. Of particular importance are vertical currents that bring nutrient-rich cooler waters to the surface in regions of upwelling. These areas are characterized by large standing stocks and high rates of production.

The upwelling period, which runs from late spring through the summer in central and northern California, depending upon the latitude, is the key to the high production of marine life, including fish and marine mammals. Lower productivity occurs during the other two oceanic seasons: the oceanic period from late summer until October when offshore oceanic water predominates and the least productive Davidson period during the winter when the surface current runs from south to north.

Another factor of importance to phytoplankton standing stock is the grazing pressure of zooplankton. The extent of grazing is affected by the size and shape of the phytoplankton cell in relation to the esophagus of the animal feeding upon it. Therefore, much of the phytoplankton population is under selective grazing pressure which will influence the overall community structure. In north temperate seas the decline of the phytoplankton population following the spring outburst is attributed to the grazing pressure of herbivorous zooplankton. The peak of zooplankton production lags behind that of phytoplankton by several weeks. The magnitude of the spring peak of phytoplankton cells illustrates the initial lack of herbivore grazing pressure. Due to different feeding requirements of larval stages there is some delay before herbivorous grazing pressure exceeds the rate of plant cell increase.

Zooplankton are an assemblage of animals which belong to nearly every

phylum. The true plankton are those which are passively carried by oceanic tides and currents. These include both mero- and holoplanktonic species. Meroplankton are organisms that spend only part of their lives as plankton. Holoplankton spend their entire lives as plankton. Hydromedusae and the larvae of fish, shellfish and many benthic invertebrates are the numerous, but seasonal meroplankton. Chaetognaths, euphausiids, copepods and larvaceans are members of the holoplankton which complete all stages of their life cycles in the water column.

According to McGowan (1974), the zooplanktonic species encountered off of California are from the three provinces: subarctic, transitional, or central; or are warm water cosmopolites; or are nearshore forms which may be endemic. In the north, subarctic and transitional forms are more abundant and in the south, central species and warm water cosmopolites are encountered more frequently. The relative proportions from the five possible sources vary geographically, seasonally and yearly due primarily to changes in current patterns.

The currents in the region are discussed by Reid, et al (1958), Wyllie (1966), Huang (1972), and Wickham (1975). The California current, which is a blend of water masses and therefore an extremely variable environment, flows southward continuously at an average rate of less than 0.5 knot. Below 200 meters is a northward flowing counter current whose influence can be traced far to the north. The California current is strongest during spring and summer when northerly winds prevail. During this period there is upwelling of nutrient rich water between the eastern boundary of the current and the coast. During fall and winter when northerly winds weaken and southerlies are common, the northward flowing Davidson current becomes established between the California current and the coast, producing a net onshore transport of water, downwelling, and bringing more transitional forms into the nearshore plankton. Bolin and Abbott (1963) describe three hydrographic seasons: divergence (upwelling) occurring from March to August and characterized by nutrient rich water; relaxation (oceanic) from September to November when warmer oceanic water may reach the coast; and convergence (downwelling) when the Davidson current flows to the north. All of these variations in transport and mixing of water affect the proportions of zooplankton from the five compartments which can contribute.

The populations of zooplankton by volume, averaged over 10 years (1951 to 1960), are shown in Figure III.A.2.a-1. Unfortunately, these averaged data do not show the entire coast and do not even show central California during the winter. However, they do show the early summer population peak reflecting, at least indirectly, the upwelling mentioned above. The upwelling is also represented in Visual 6 from a single cruise from June 30 to July 22, 1958 (Smith 1971; Cal COFI Atlas 13). Unfortunately, very few of the Cal COFI trips sampled the northern California coast, so averaging data over several years and mapping them would have very limited value and is probably the reason it has not been done. Despite the patchy distribution, typical for plankton, even the single cruise maps reflect maximum zooplankton abundance during the

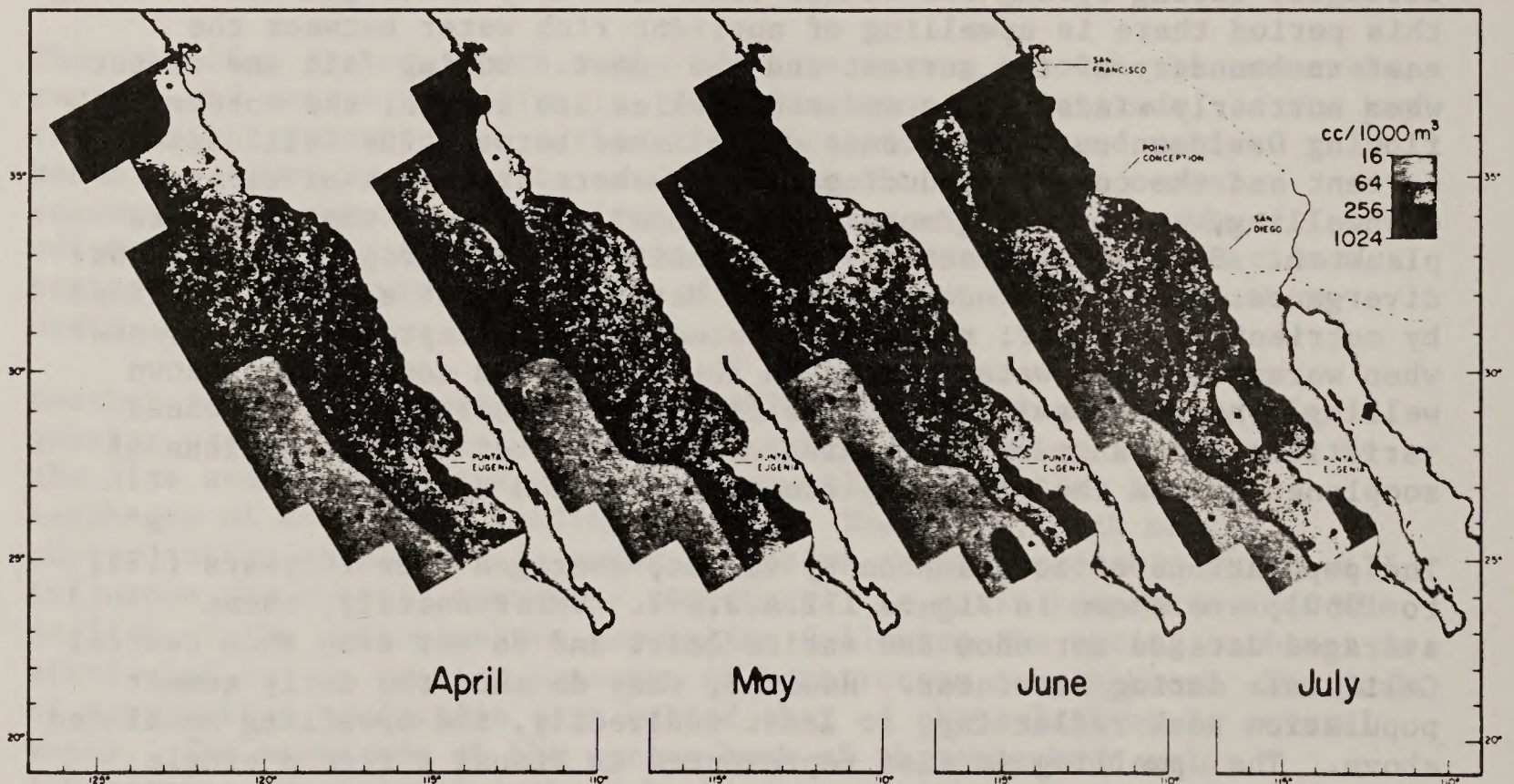
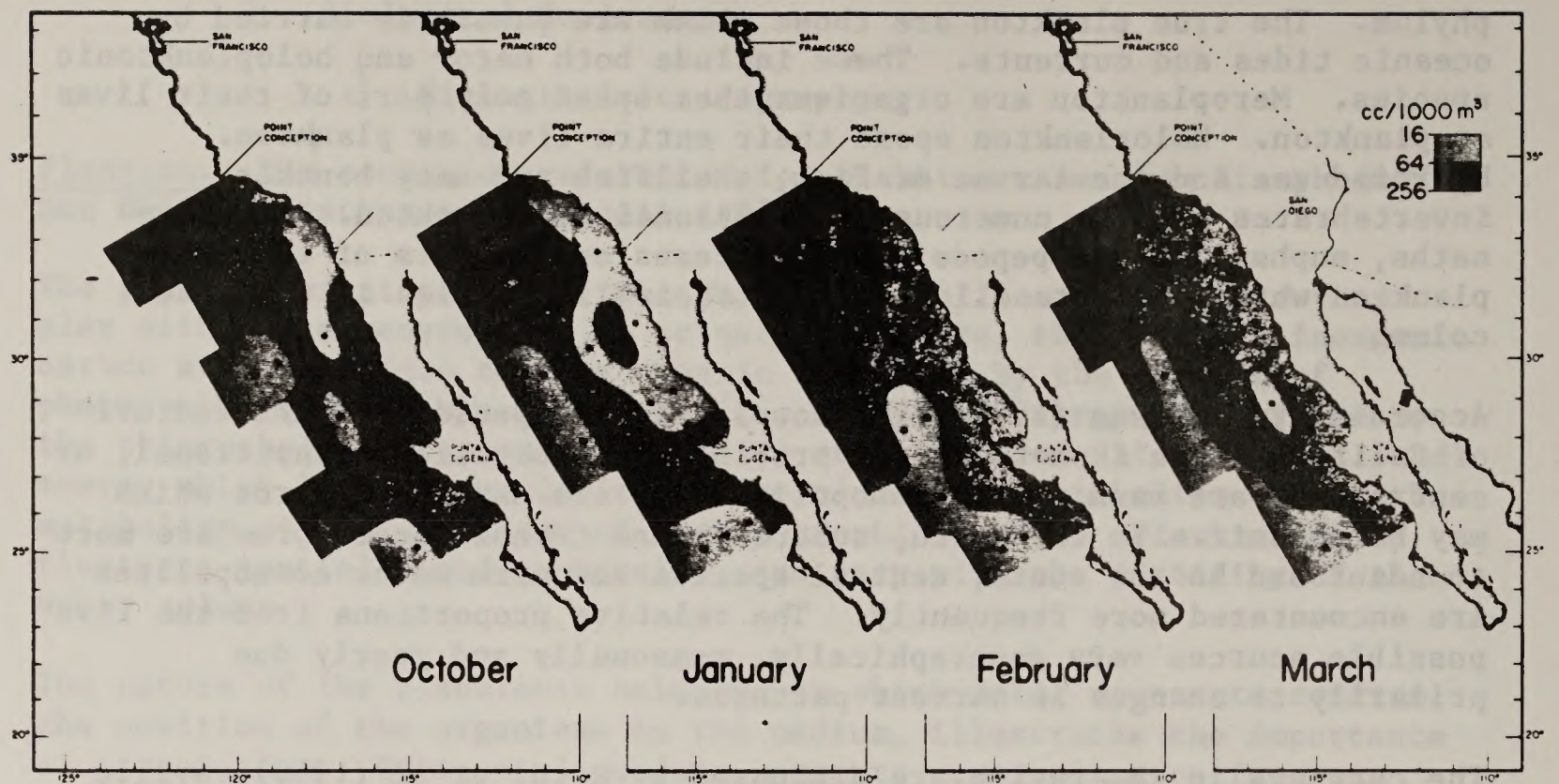


Figure III.A.2.a-1 Median Zooplankton Volumes (cc/1000 m³; Large Organisms Removed) 1951-1960

Source: CalCOFI (1971)

summer period compared with other seasons conducted during single cruises. (Large overlays of these seasons are available at the POCS office in Los Angeles.)

Because of patchy distribution of plankton, single year coverage from a single cruise per season has limited value. However, Figures III.A.2.a-2 through III.A.2.a-5, all taken during 1959, show the spring and summer high zooplankton populations for central California.

Unlike phytoplankton whose effective productivity is limited to the upper 100 m of water, zooplankton occur at all depths and have the ability to migrate vertically up to several hundred meters. Zooplankton are important fish food although most fish are near surface plankton themselves early in their life cycle. A brief overview of fish found in central and northern California is provided in the Commercial Fisheries section (III.B.2.c).

Northern California is extremely productive (Milton Boyd, personal communication, Visual 6). There is apparently a small cold water gyre just south of Cape Mendocino caused by nearly constant upwelling, which harbors several benthic macroinvertebrates not found again until much further north. This area could also harbor the larvae of these species in its plankton before adulthood is reached.



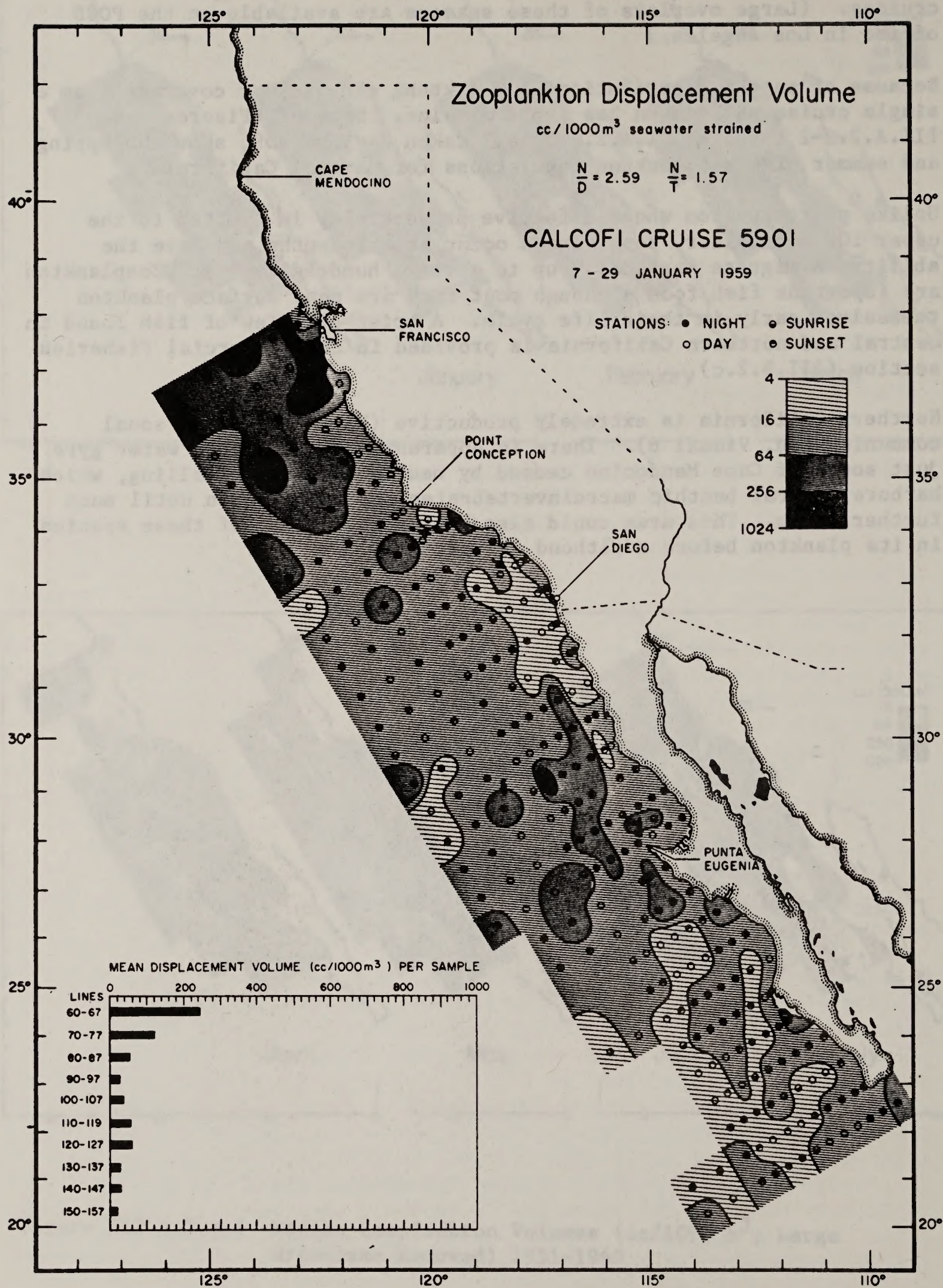


Figure III.A.2.a-2 Zooplankton Displacement Volume
Source: CalCOFI (1971)

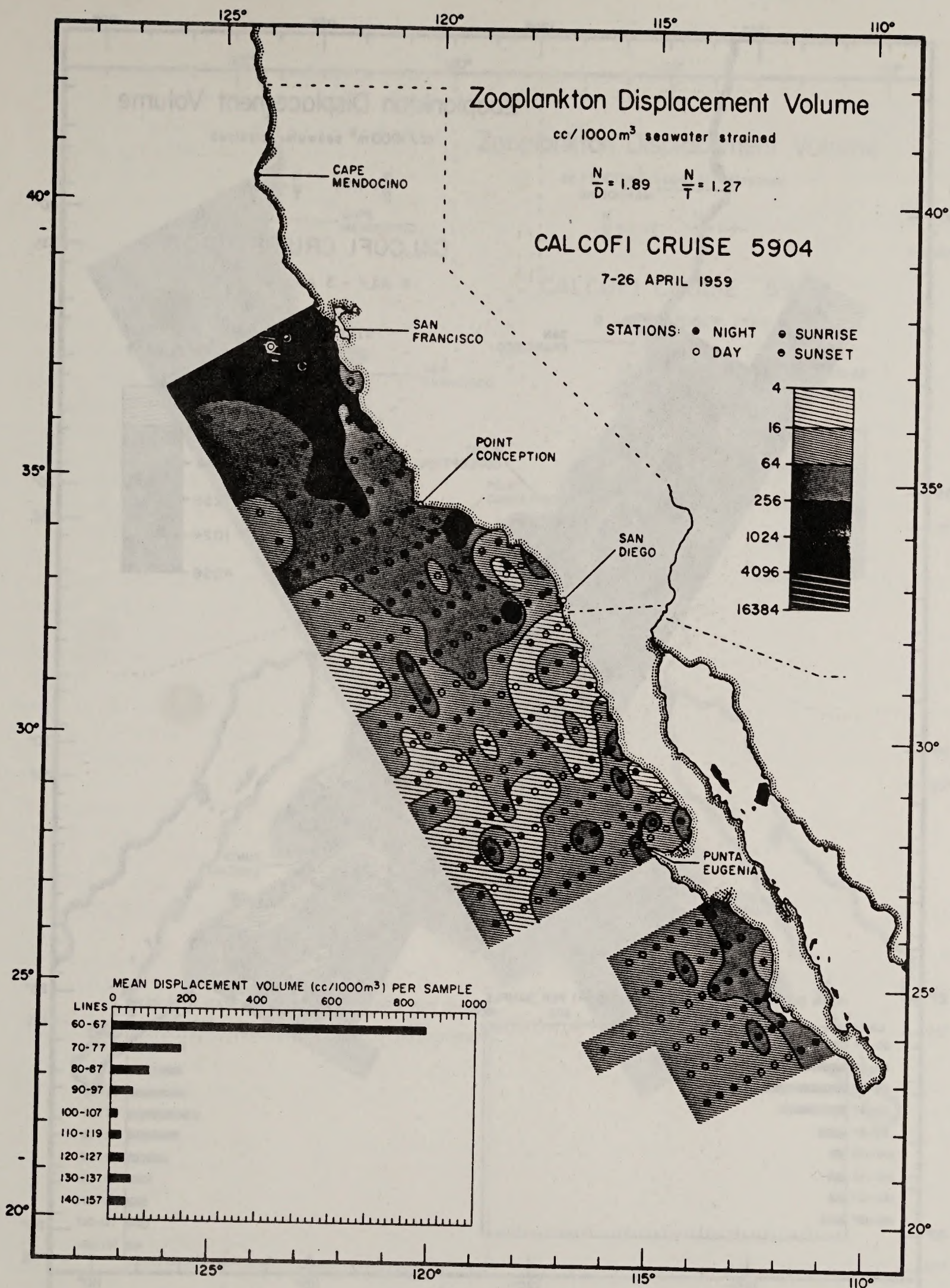


Figure III.A.2.a-3 Zooplankton Displacement Volume

Source: CalCOFI (1971)

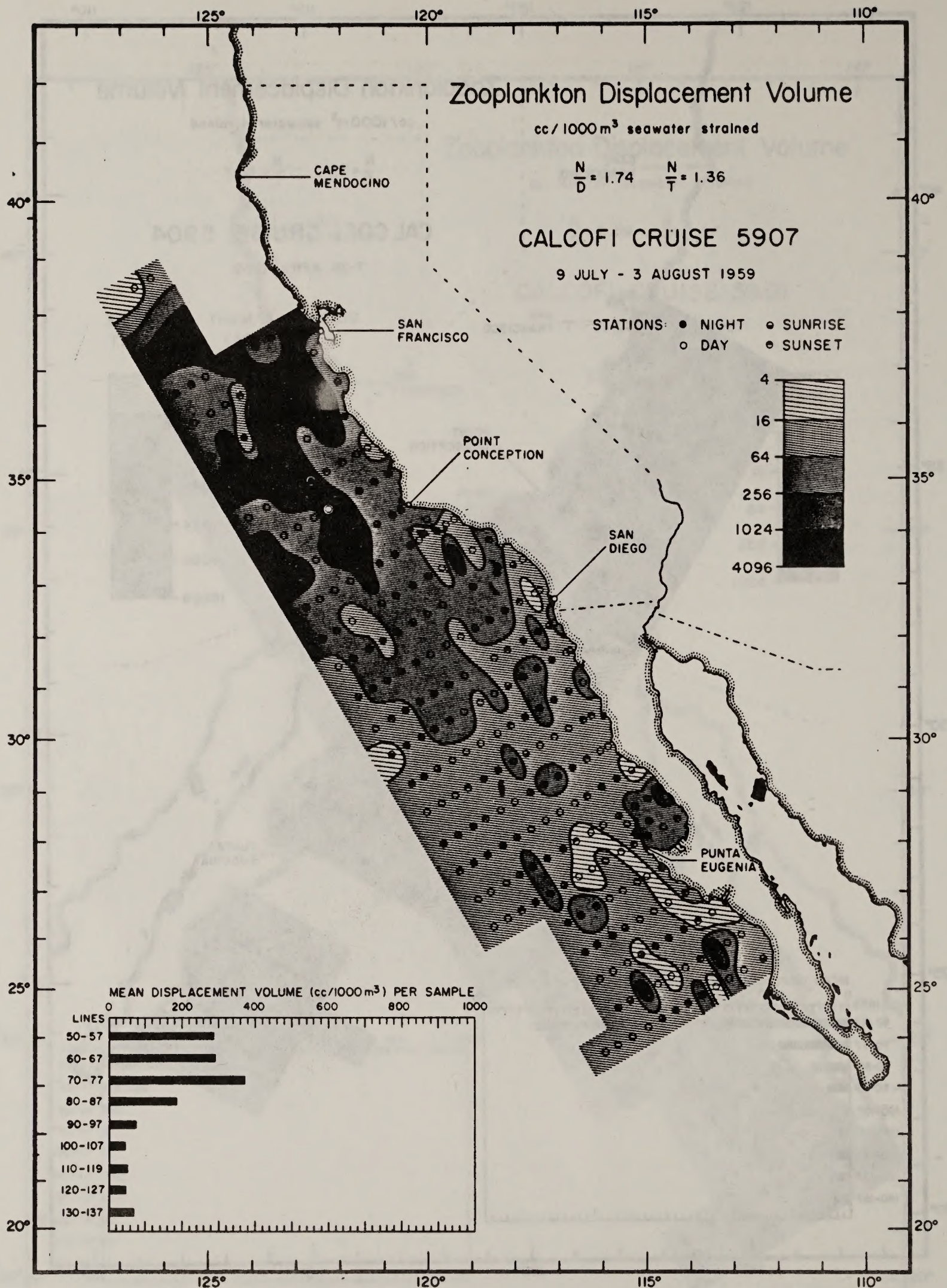


Figure III.A.2.a-4 Zooplankton Displacement Volume
Source: CalCOFI (1971)

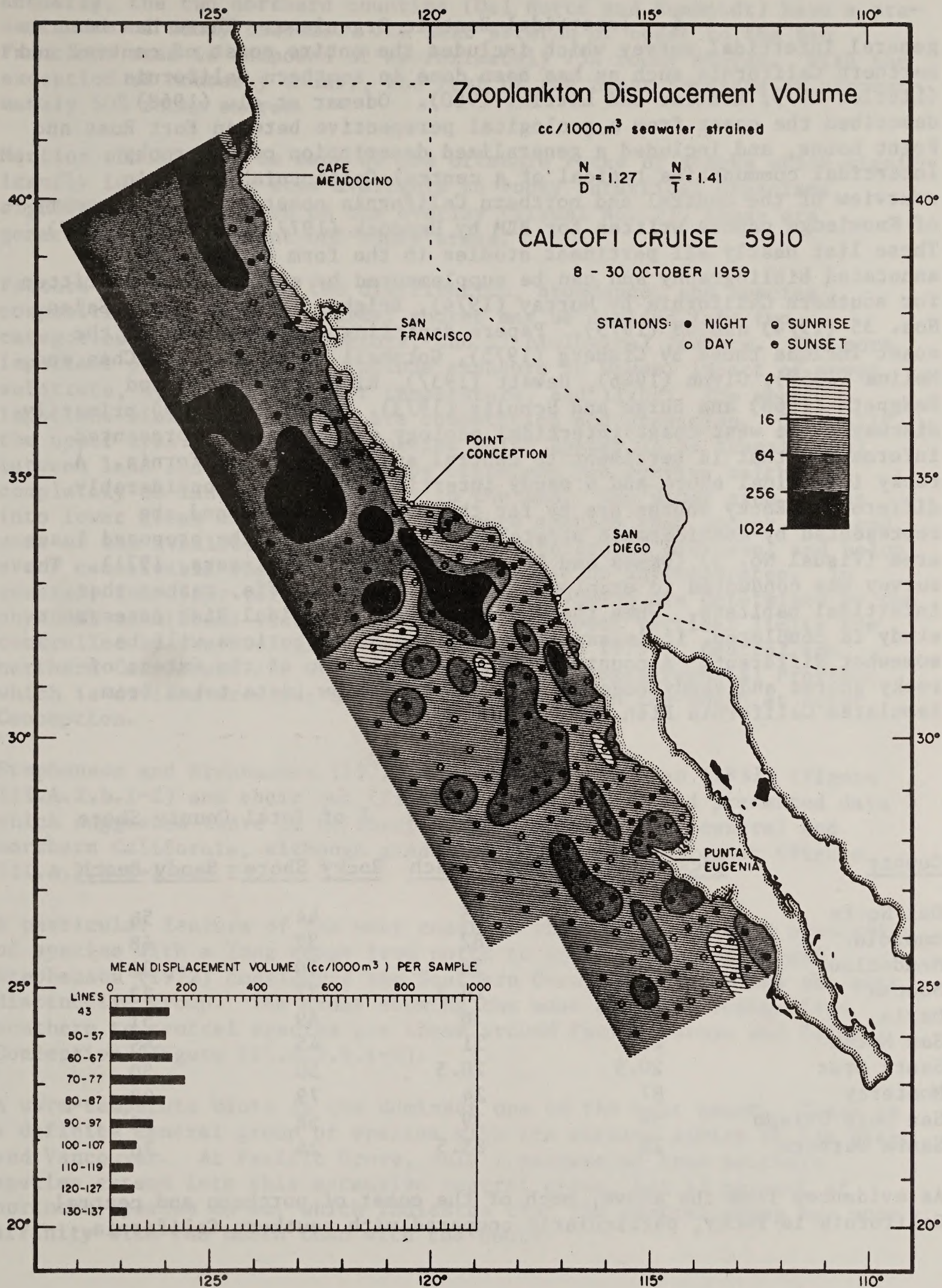


Figure III.A.2.a-5 Zooplankton Displacement Volume
Source: CalCOFI (1971)

b. Important Marine and Coastal Habitats

i. Intertidal Benthic Organisms: There has been no general intertidal survey which includes the entire coast of central and northern California such as has been done in southern California (Littler 1979; Littler and Littler 1980). Odemar et al. (1968) described the coast from a geological perspective between Fort Ross and Point Lobos, and included a generalized description of the rocky intertidal communities typical of a central California area. An overview of the central and northern California coast is in the Summary of Knowledge papers written for BLM by Hancock (1977) and Hardy (1977). These list nearly all pertinent studies in the form of a partially annotated bibliography and can be supplemented by similar papers written for southern California by Murray (1974), Bright (1974), and OCS Sales Nos. 35 (1974) and 48 (1979). Papers depicting certain areas of the coast include those by Cimberg (1975), Gotshall et al. (1974), Chan and Molina (1969), Glynn (1966), Hewatt (1937), Ricketts, Calvin and Hedgpeth (1968) and Burge and Schultz (1973). Carefoot (1979) primarily discussed the west coast intertidal ecology of Canada, but presented information that is pertinent to central and northern California. A rocky intertidal shore and a sandy intertidal beach are considerably different. Rocky shores are by far the most productive and are represented by considerable stretches of coastline in the proposed lease area (Visual No. 5) (Dames and Moore for Corps of Engineers, 1971). The survey was conducted to examine supratidal rocky cliffs, rather than intertidal habitats. When the BLM-sponsored Intertidal Risk Assessment study is completed, it is expected that the distributions will be somewhat different. A county by county tabulation of the extent of rocky shores and sandy beaches is presented below (data taken from tabulated California Fish and Game 1973).

<u>County</u>	<u>Miles</u>		<u>% of Total County Shore</u>	
	<u>Rocky Shores</u>	<u>Sandy Beach</u>	<u>Rocky Shore</u>	<u>Sandy Beach</u>
Del Norte	20	25	44	56
Humboldt	39	82	32	68
Mendocino	82	36	70	30
Sonoma	47.7	14.3	77	23
Marin	34	36	49	51
San Mateo	25	31	45	55
Santa Cruz	20.5	20.5	50	50
Monterey	87	24	79	22
San Luis Obispo	54	39	58	42
Santa Barbara	26	83.5	24	76

As evidenced from the above, much of the coast of northern and central California is rocky, particularly compared with southern California,

(notice Santa Barbara County) which has approximately 80% sandy beaches. Actually, the two northern counties (Del Norte and Humboldt) have a predominance of sandy beaches. The next stretch of coast to the San Francisco area is composed of approximately 75% rocky shores. With the exception of Monterey County, the rest of the coast consists of approximately 50% rocky shores.

Mention should also be made of the offshore rocks or stacks which significantly increase the area available to rocky intertidal organisms significantly. As seen on the overlay (Visual No. 5), these are generally most abundant off rocky areas.

Factors which influence the distribution, abundance, and species composition of rocky intertidal shores may be divided into two categories: 1) physical factors, and 2) biological factors. The more important physical factors include exposure to waves, impact of waves, substrate, desiccation, water temperature, and light. The more important biological factors are competition and predation. Generally, the upper area contains some species which appear to be transitional between land and sea forms. These organisms can survive neither completely on land nor completely in the sea. The upper area grades into lower areas which have more and more species that occupy more and more of the available space, until somewhere around mid-level and below, every conceivable space is inhabited by algae or invertebrates. In general, the upper vertical limits of rocky shores are determined by the physical conditions listed above, while the lower vertical limits are controlled by the biological factors (Carefoot 1979). Central and northern California are within the Oregonian biogeographical Province which is divided from the Californian Province in the south at Point Conception.

Stephenson and Stephenson (1972) analyzed data by Keen (1937) (Figure III.A.2.b.i-2) and their own (Figure III.A.2.b.i-1) and presented data which suggested there is no sharp faunal change within central and northern California, although gradual gradations are present (Figure III.A.2.b.i-1 and 2).

A particular feature of the west coast is the relatively high proportion of species with a long range from north to south. Stephenson and Stephenson (1972) considered the Southern Group of species was the most distinctive group. The areas showing the most definite change from southern to central species are those around Pacific Grove and Point Conception (Figure III.A.2.b.i-2).

A warm-temperate biota is the dominant one on the west coast. There is a definite central group of species with its extreme limits at San Diego and Vancouver. At Pacific Grove, only 1 percent of true southern species extend into this extensive central group, but 13 percent of northern species do so, which indicates that the central group has more affinity with the north than with the south.

Figure III.A.2.b.i-1

The distribution of the three main groups of the biota of the west coast of North America. The graphs are based on data collected by the authors, and refer mainly to the commonest species. The graph for the northern group shows that of the 117 species collected at Nanaimo, 52 extended to Pacific Grove and 23 to La Jolla; the other graphs can be similarly interpreted.

Source: Stephenson and Stephenson. 1975.

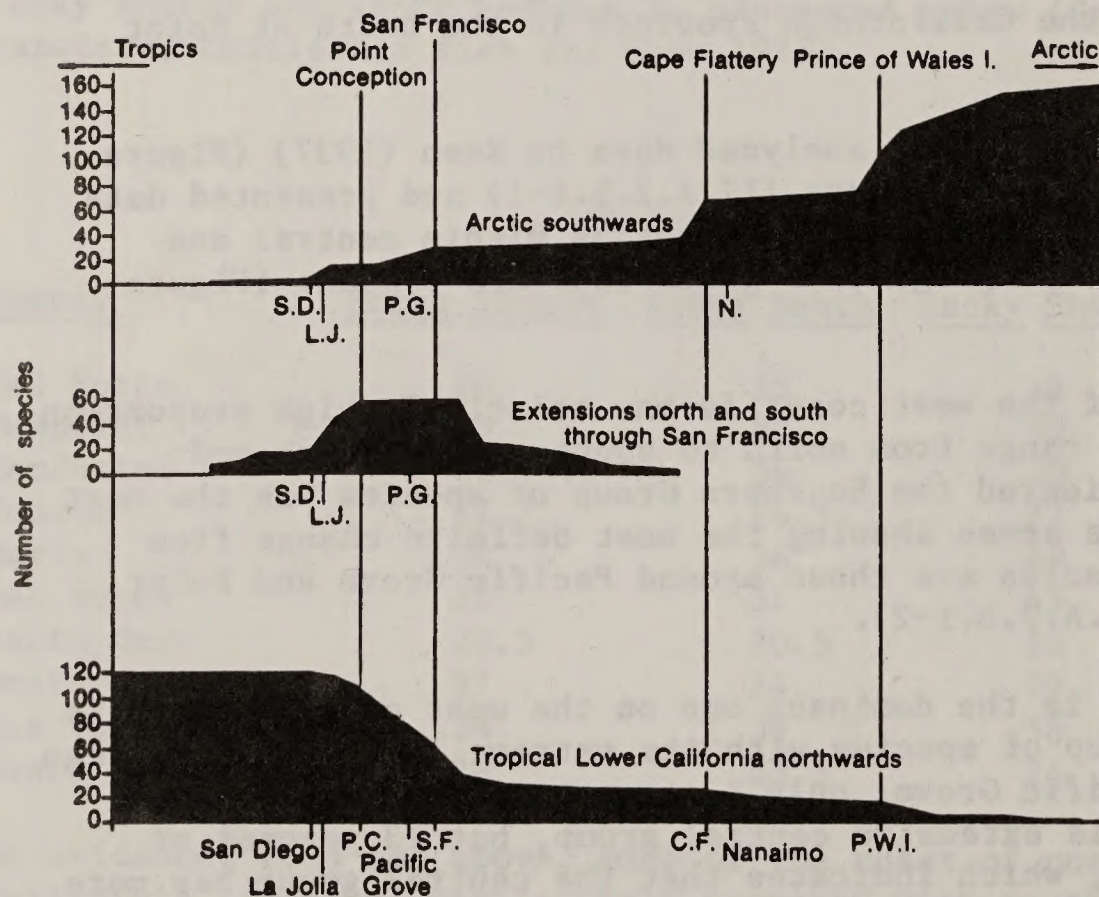
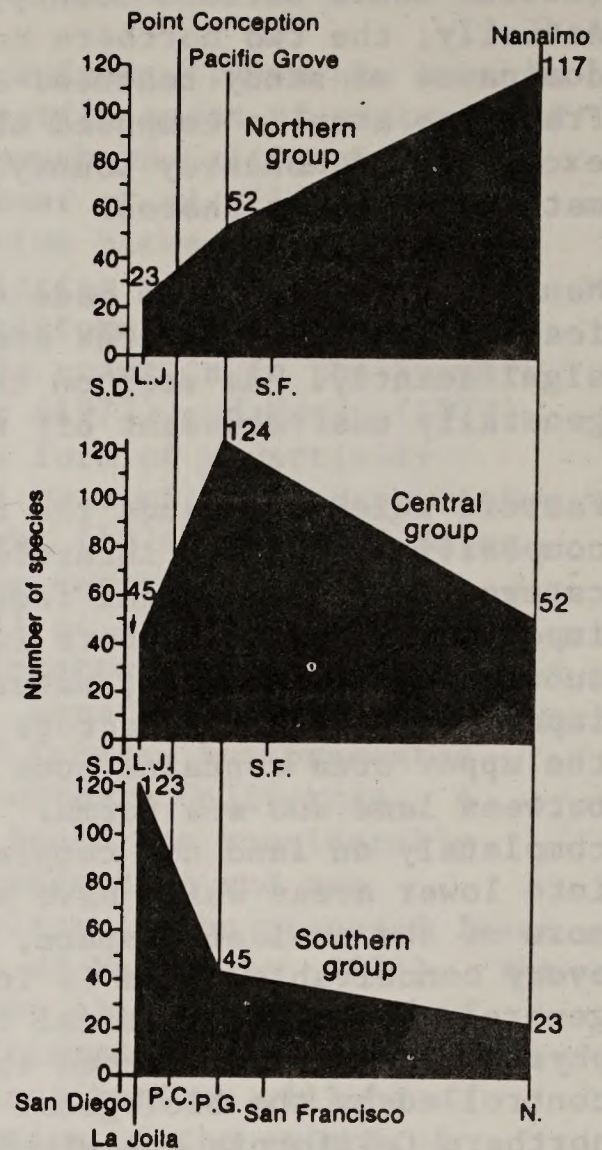


Figure III.A.2.b.i-2

Graphs similar to those in Figure III.A.2.b.i-1 compiled from data taken from Keen (1937). These graphs, though based on greater numbers of species, indicate the same three main groupings, the central one with stronger northern affinities. The greater number of species smooths out the lines.

Source: Stephenson and Stephenson. 1975.

Around Point Conception, there are a number of species with a limited geographical range. The Santa Barbara Channel in southern California is known (BLM, 1979) as an area containing endemics, but not as much has been written about the endemic species north of Point Conception, largely because not as many investigations have been conducted in the area. The geographical distribution of molluscs by Keen (1937) (Figure III.A.2.b.i-2) suggests the degree of endism may be quite high between Point Conception and Pacific Grove).

Some species having geographical distributions extending into both the Oregonian and the Californian Province occur in somewhat different habitats in the two regions. Apparently because of water temperature differences, some southern California species, regarded as subtidal in distribution, find tolerable water temperatures intertidally in central and northern California. The red abalone (Haliotis rufescens) is an important example of this.

Boyd (personal communication) reports a possible subprovince break just south of Cape Mendocino possibly caused by cold water upwelling in the area. Boreal species such as the starfish, Solaster stinsoni, and the cnidarian, Eunephthya rubiformis, have disjunct distributions and are not found again until much further north. This phenomenon also has importance in other biological habitats.

Brief summaries of studies conducted at four locations, Trinidad Head (Cimberg, 1975), Point Arena (Gotshall et al., 1974), Pacific Grove (Stephenson and Stephenson, 1972) and Diablo Cove (Burge and Schultz, 1973), will follow. More complete coverage is also available in California URA (BLM, Pacific OCS Office).

According to Cimberg (1975), the dominant species found in four vertical zones were similar to those found in zones described at other localities along the protected outer coast of North America from Alaska to Point Conception, and possibly further south.

The Point Arena intertidal was not found (Gotshall et al., 1974) to have the usual lush and diverse assemblage of macroinvertebrates typical of the open coast. Invertebrates which are indicative of high energy beaches (e.g., the goose neck barnacle Pollicipes polymerus, the mussel Mytilus californianus, and the sea star Pisaster ochraceus were found to occur in unusually low abundance at the Point Arena sites. The siltstone substrate which occurs at this site was considered as a possible explanation of this. However, large and powerful waves impact the site such that few organisms were able to survive. This was considered a more likely explanation of the depauperate nature of the biota, since an area, located 2 km north, exhibited a more typical assemblage of organisms and occurred on similar siltstone substrate.

In contrast to what was found at the Point Arena site, the Monterey Bay area, particularly Pacific Grove, has been found to exhibit very

productive intertidal communities. Here is where Ricketts conducted most of his studies. Several notable intertidal studies were also conducted in this area including those of Hewatt (1935, 1937), MacGinitie (1939), Roberts (1941) and Glynn (1965). Many other studies, particularly on individual species, the classical Marine Algae of Monterey Bay by Smith (1969), and Marine Algae of California (Abbott and Hollenberg 1976), are also available covering this area.

In the Endocladia muricata-Balanus glandula association, located just above the mussel zone at Pacific Grove, Glynn (1966) found 93 species of plants and animals. However, in this association, only 28 of the animal species occurred more than 98 per cent of the time. Of these, a small viviparous clam, Lasaea cistula, found only in this association, was among the most abundant, sometimes occurring in the thousands in comparatively small areas. In the most concentrated part of the zone, Glynn found more than 210,000 individuals of L. cistula per square meter. This represented a total dry weight of 2,640 grams per square meter (roughly equivalent to 5 pounds per square yard). This elaborate microcosm thrives in a zone that is under the sea only 28 percent of the time, and accordingly receives suspended food material from the sea in lower amounts than lower intertidal areas.

Stephenson and Stephenson (1972) surveyed the vertical distribution of dominant intertidal organisms in Pacific Grove and surrounding areas (Figures III.A.2.b.i-3 and -4). The biota in these diagrams fairly well typify the central California intertidal (Ricketts, et al. 1968).

Less than 100 miles south of Point Lobos is the Diablo Cove area. The Diablo Cove study site is located in the middle of a 13-mile segment of rocky shoreline. This rocky beach is separated from other rocky areas by sandy beaches which stretch for ten miles to the north and 30 miles to the south. As a result of this isolation, Burge and Schultz (1973) claim that recruitment must come entirely from within the rocky area itself, rather than from other coastal areas.

Many of the more productive or unique rocky intertidal areas in central and northern California are shown in Table III.A.2.b.i-1. The list is not exclusive, but consists of the Areas of Special Biological Significance (ASBS), largely based upon valuable intertidal areas. Pinnipeds are components of the intertidal much of the time. Several additional areas were added by BLM biologists who observed them on trips through the area. Several unusual, but seldom described areas include the highly convoluted shoreline between Fort Bragg and Fort Ross including Russian Gulch. In terms of surface area of shoreline, with added evidence from Russian Gulch, and 4 ASBS within the area, this coastal region is very valuable and probably highly productive. The Bean Hollow State Beach intertidal area south of San Francisco is extremely productive.

A far more complete knowledge of rocky intertidal areas will be known

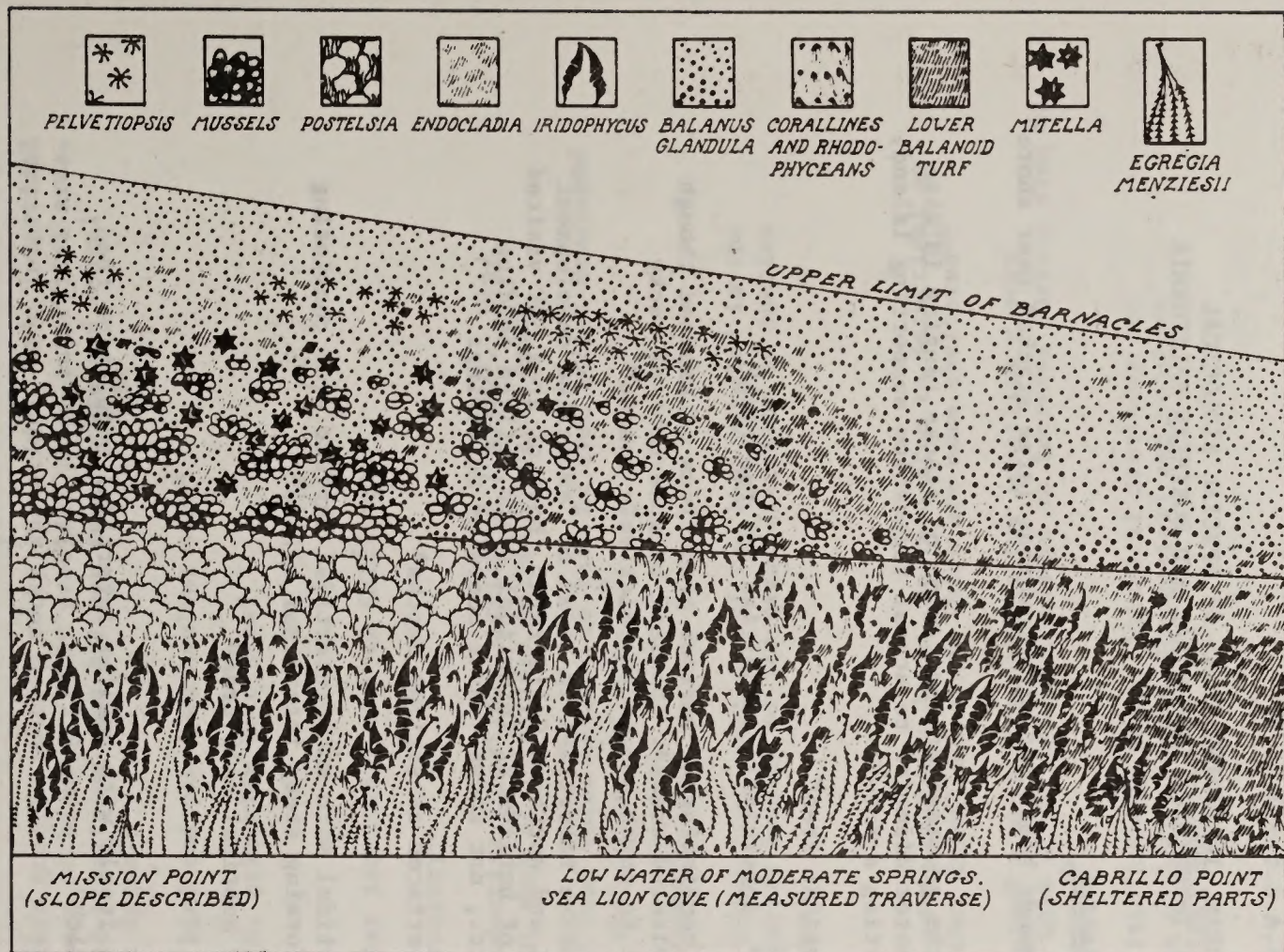


Figure III.A.2.b.1-3

A comparison of the zonation of moderate slopes at different localities in the Pacific Grove region. The various slopes are subject to different types and degrees of wave action. In this drawing, the exposure to strong wave action is on the left and sheltered conditions are on the right.

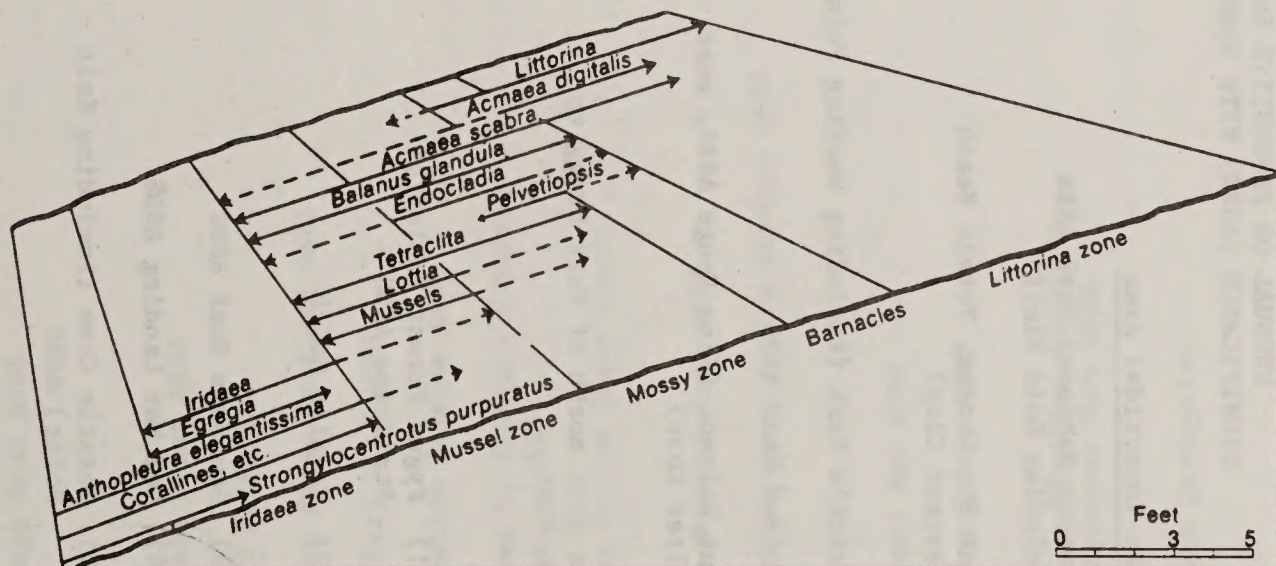


Figure III.A.2.b.1-4

The extents of the main populations of several common plants and animals on a smooth slope in Sea Lion Cove, Point Lobos. The thick diagonal line in the foreground represents a measured level section. Vertical and horizontal scales are the same.

Source: Stephenson and Stephenson. 1975.

TABLE III.A.2.b.1-1

UNUSUAL OR PRODUCTIVE ROCKY INTERTIDAL AREAS, INCLUDING AREAS OF SPECIAL BIOLOGICAL
SIGNIFICANCE (ASBS) WITH SOME ROCKY INTERTIDAL IMPORTANCE IN CENTRAL AND NORTHERN CALIFORNIA

<u>Rocky Intertidal Area</u>	<u>Characteristics</u>
Redwoods National Park ASBS (including Gold Bluff)	Actually sandy beach but with numerous large stacks* near shore ^b
Point St. George, Pebble Beach (Crescent City)	Possibly the greatest concentration of stacks ranging in size from one meter diameter to actual vegetation supporting island, one supporting a tree ^b
Patrick's Park (including Wedding Point)	Rich intertidal area ^b
Trinidad Head ASBS	Kelp area ^a , intertidal communities not too rich ^b
Point Delgada (King Range ASBS, near Shelter Cove)	Rich area consisting of various gradations of exposed though partly sheltered areas ^a . Unusual because most of rocky intertidal to north and south relatively sparse ^b
Area just north of Fort Bragg to Fort Ross	Most extensive intertidal in terms of "shoreline development" in central and northern California. Most of area not visited so extent of horizontal intertidal reefs, tilted bedding plains, etc., not known. Area contains following:
(1) Pygmy Forest Ecological Staircase ASBS	Subtidal terraces at various depths ^a
(2) Russian Gulch	Rich intertidal with much intertidal surface area consisting of coves forming steep intertidal cliffs ^b
(3) Saunders Reef ASBS	Near shore subtidal kelp area ^a
(4) Del Mar Landing ASBS	^a
(5) Gerstle Cove (including Salt Point) ASBS	Salt Point itself with smaller intertidal population than Russian Gulch ^b

TABLE III.A.2.b.i-1 (Cont.)

<u>Rocky Intertidal Area</u>	<u>Characteristics</u>
Bodega Head ASBS	Most northern granite outcrop rocky intertidal, wide intertidal shelf at base of backing cliffs provides large intertidal area. May reflect transition zone between temperature and boreal geographic fauna. ^a
Double Point ASBS	Primarily bird and pinniped haulout area ^a
Bird Rock ASBS	Large stack, primarily bird area ^a
Point Reyes Headland ASBS	^a
Duxbury Reef ASBS	Largest flat intertidal reef in California ^a
Farallon Islands ASBS	Pinniped rookery ^a
James V. Fitzgerald Marine Reserve ASBS	Highly productive intertidal stretch of 5 miles ^a . Many stacks, but much of intertidal backed by sandy beach ^b
Bean Hollow State Beach	Intertidal reef which appears to have an even better developed community than Fitzgerald Reserve ^b
Ano Nuevo Island ASBS	Pinniped rookery ^a
Pacific Grove Marine Gardens ASBS	Important intertidal area; one of the best studied in the country, partly because of its great diversity of species and richness ^b
Carmel Bay ASBS	^a
Point Lobos ASBS	Many deep coves giving a lot of surface area to intertidal as well as other intertidal areas which are more sheltered ^{ab}
Julia Pfeiffer Burns Underwater Park ASBS	Creek opening ^a - surrounded by Big Sur coastline - very steep but with a few coves and stacks to increase surface area of the intertidal ^b
Point Conception	Dividing line between major biological provinces and consisting of both northern (Oregonian) and southern (Californian) species

^aCalif. Water Resources Control Board.

^bBLM Field observations.

*Offshore islands or large rocks having an intertidal area.

TABLE III.A.2.b.i-2

ESTUARIES OF ECOLOGICAL CONCERN IN NORTHERN AND CENTRAL CALIFORNIA

<u>Estuary</u>	<u>Opening to Sea</u>	<u>Bird Feeding Area (+)</u>	<u>Important Marine</u>	
			<u>Fish Nursery Grounds (I)</u>	<u>Important Anadromous Fish Spawning Route</u>
Smith River Delta	Open year round	+	+	+
Lake Earl/ Lake Talawa	Intermittently open	+	+	+
Klamath River	Open year round	+	+	+
Redwood Creek	Intermittently open	+	+	+
Stone Lagoon	Intermittently open	+	+	+
Dry Lagoon	Intermittently open	+	-	-
Big Lagoon	Intermittently open	+	+	+
Mad River	Intermittently open	+	+	+
Humboldt Bay (including Arcata Bay)	Open year round-- constant width, by jetties	+	+	+

TABLE III.A.2.b.i-2 (Cont.)

Eel River	Open year round	+	+	+
Mattole River	Intermittently open	+	-	+
Little River	Intermittently open	+	-	+
Ten Mile River	Intermittently open	+	+	+
Noyo River	Open year round width permanent due to jetties	+	+	+
Big River	Open year round	+	+	+
Albion River	Open year round	+	+	+
Navarro River	Open year round (nearly closes)	+	+	+
Garcia River	Open year round	+	+	+
Gualala River	Intermittently open	+	+	+
Russian River	Open year round	+	+	+
Salmon Creek	Intermittently open	+	-	minor
Bodega Bay	Open year round constant width maintained by jetties	+	+	-

TABLE III.A.2.b.i-2 (Cont.)

Estero Americano	Intermittently open	+	+	-
Estero San Antonio	Intermittently open	+	+	-
Tomales Bay	Open year round	+	+	+
Abbotts Lagoon	Intermittently open	+	-	-
Drakes Estero/ Limantour Estero	Open year round	+	+	+
Balinas Lagoon	Open year round	+	+	+
Rodeo Lagoon	Intermittently open	+	-	+
San Francisco Bay complex	Open year round	+	+	+
San Gregorio Creek	Intermittently open	+	-	+
Pescadero Creek	Intermittently open	+	+	+
Gazos Creek	Intermittently open (open most of year)	+	-	+
(steelhead)				

TABLE III.A.2.b.1-2 (Cont.)

Scott Creek	Intermittently open	+	-	+	(minor)
Baldwin Creek Ponds	Intermittently open	+	-	+	(minor)
Corcoran Lagoon/ Moran Lake	Intermittently open	+	-	+	(minor)
Wilder Creek Pond	Intermittently open	+	-	+	
San Lorenzo River	Open year round	+	-	+	
Watsonville Slough/Pajaro River	Open year round	+	-	+	
Elkhorn Slough complex	Open year round constant width maintained by jetties	+	+	-	
Salinas River	Intermittently open	+	-	-(minor)	
Carmel River	Intermittently open	+	+	+	
Little Sur River	Intermittently open	+	+	+	(steelhead)
Big Sur River	Intermittently open	+	+	+	(steelhead)
Morro Bay	Open year round constant width maintained by jetties	+	+	-	
Santa Maria River	Intermittently open	+	-	-	
Santa Ynez River	Intermittently open	+	-	-	

upon completion of the Intertidal Risk Assessment Study.

The environment of the exposed sandy intertidal is considerably less stable than that of the rocky intertidal. Every wave on a sandy intertidal beach moves large amounts of sand. Animals living on surf-swept rocky intertidal areas have solved the problem of wave shock by evolving powerful attachment devices or by living in cryptic habits. Organisms on surf-swept sandy beaches achieve the same solution by burrowing (burying) themselves in the sand.

Because of the continued restructuring of sandy beaches, the number of individuals per species varies greatly from year to year. There is, however, a characteristic group of animals which live just below the low tide line or within the sand between the tide lines. A few organisms even live higher up on the beach in burrows or beneath organic debris. Additional general comments are presented by Cubitt (1969), MacGinitie and MacGinitie (1949), Ricketts et al. (1968), and Trask (1970).

Accounts dealing with sandy areas are few. Although Allen (1964) collected 20 species in northern California, only the mole crab was collected every year (1958 to 1961), the others were absent or in low abundance at least one of the years studied. As few as 3 to 5 species were collected at a site, while the maximum collected per site was 18, far fewer than rocky intertidal areas.

Two species of recreational and economic importance, the razor clam Siliqua patula, typical of the northern regions, and the pismo clam Tivela stultorum, more common in central California, should be mentioned as important members of this habitat.

ii. Subtidal Benthic Organisms: The subtidal benthic fauna and flora of California offshore waters have been summarized in earlier outer continental shelf resource analyses by the U.S. Department of the Interior (1975, 1978a, 1978b, 1979), Murray (1977) and Bright (1977). A comprehensive literature survey by Winzler and Kelly Consulting Engineers (1977) summarized previous benthic studies in the northern and central California region. In comparison to surveys of southern California subtidal benthic communities, the central and northern California subtidal associations are less well known, although the Monterey Bay region may represent an exception to this rule. Numerous other studies of central and northern California subtidal benthic communities have been conducted and include Allen (1964), Hardy (1972, 1973), Johnson (1971) and Odemar, et al. (1968); however, most of these are relatively localized in scope and tend to focus on areas close to shore.

There is a wide range of variation in characteristics exhibited by subtidal benthic communities. The most significant physical factors contributing to these variations are depth and substrate type (see Visual No. 11). Water depths will range from several meters to more than 760 meters (2,500 feet) in the deeper tracts. The proposed lease areas will include portions of the continental shelf, slope and submarine canyons, all of which have different depth gradients. The bottom types will include submerged rocky reefs (hard substrate), cobble and gravel, as well as sand, mud and clay (soft bottoms). Biological factors which may influence benthic community structure include such phenomena as breeding aggregations, reproductive swarming, patchy larval settling, predation, seasonal migrations, and longevity (Coull 1977).

A generalized sediment distribution pattern across the continental shelf would consist of sandy habitats nearshore, dominated by filter feeding organisms, followed by progressively deeper environments of silt and clay sediments with increasing numbers of deposit feeders. At the shelf break, where the continental slope begins, the sediment has become completely silt and clay (e.g. mud) and the community is dominated by deposit feeders. Exceptions to this sequence occur at canyon and reef areas, listed below (see Visual No. 5, Weldy and Williams 1975).

Generally, hard bottom/rocky bank habitats are of primary interest since they often support prominent communities (e.g., kelp and coral) and cover relatively small areas of the outer continental shelf. Kelp habitats, as previously noted (Weldy and Williams, 1975) are present along a major portion of the coast, occurring to depths of approximately 30.5 m (100 feet). The distribution of coral beds is not well known in northern and central California; Monterey Canyon and select areas near Carmel Bay and Point Buchon (Visual No. 5), however, are noted for the presence of coral outcrops. Although the coral beds are not of the tropical reef-building kind, they do include hydrocorals (e.g., Allopora, horny corals (e.g., Lepidisis, Paragorgia) and non-reef building corals (e.g., Paracyathus, Balanophyllia). Other specific areas where hard bottom communities are located include: St. George Reef, near Crescent City; Tolo Bank, about 64.4 km (40 miles) north of Fort Bragg; Cordell Bank, off Point Reyes; and areas around the Farallon Islands, off San Francisco. There are also twenty Areas of Special Biological Significance (California State Water Resources Control Board, 1976) along the coast which include nearshore subtidal habitats.

iii. Marine Vegetation - Kelp: The discussion in this section will concentrate on the kelp that form forests. This type of kelp growth both alters the characteristics in the immediate ocean environment, and provides habitat for numerous organisms in a similar to major vegetation communities (or biomes) on land. Other algae will be very briefly covered under their appropriate habitat (see benthos - intertidal and subtidal).

Two seaweeds form kelp forests in California and have overlapping forest-forming ranges in central California: Macrocystis and Nereocystis.

The giant kelp or Macrocystis, identified by having many floats (pneumatocysts), is distributed from Sitka, Alaska to Point Abrevjas, Baja California, but does not form extensive forests north of Point Ano Nuevo. DeMartini (personal communication) reports small forest type patches of Macrocystis as far north as Mendocino County (Visual No. 5). The bull kelp or Nereocystis, having a single float from which originate numerous lamina or blades, is distributed from Alaska to Santa Barbara, but forms forests only north of Point Conception (Smith, 1969; Bell and Ally, 1972).

Many investigators have reported on the various aspects of the life history, biology, and ecology of kelp. Detailed information on these subjects may be located in publications such as Abbott and Hollenberg (1976), Feder, et al., (1974), North (1971), North and Hubbs (1968), and U.S. Dept. of the Interior (1979).

References for central and northern California include: Foster (1979a, 1979b), California Department of Fish and Game, Marine Biologist, M.S. Oliphant (personal communication 1979), U.S. Department of the Interior (1977), and Winzler and Kelly Consulting Engineers (1977). These are the primary sources of information which is specific to central and northern California.

Two significant life history differences exist between the two kelp species. Nereocystis is an annual, and the forest formed by this species is almost completely replaced every year. Macrocystis is a perennial and the individual plants of the forests tend to remain for periods of over a year.

Giant Kelp. The life history of Macrocystis consists of a large, long-lived (from one to six years) sporophyte plant and a microscopic, short-lived (several months) gametophyte plant. Except for the reported asexual reproduction of one species which exists in a limited geographic range, this sexual life cycle is necessary for the propagation of the species. The completion of the life cycle requires one year in optimal environmental conditions (Neushal, 1963) and probably somewhat longer under other conditions. Anderson and North (1966) have found that, despite an extremely high rate of sporulation, the successful

recruitment of Macrocystis sporophytes decreases exponentially with distance from the parent plant and is essentially limited to an area within 5 m of the parent. This contrasts with the dispersibility of other benthic organisms which have spores or larvae that drift for miles before settling. This has resulted in speculation that drifting plants may serve as an important means of propagating the species.

Kelp are known (Frey 1971) to be the fastest growing plants on earth. Under optimum conditions of clear, cool, nutrient-enriched waters of less than 17.9°C (66°F), kelp may increase in length from 12 to 24 inches (30 to 61 cm) in a single day. Miller and Geibel (1973) reported the greatest mean rate of growth to be 5 inches (13 cm) per day during the summer in Monterey Bay. These rates decreased to 1 to 3.6 inches (3 to 9 cm) during the cooler periods of the year.

There are many factors which are known to influence the distribution of kelp. Physical factors include: water temperature, character of the substrate, currents, exposure to waves, bottom light intensity, and smothering by sediments. Biological factors include: grazing, self shading, encrusting growths, preemption of the bottom by other plants, and "black rot", a disease of unknown (North, 1971) cause. Chemical factors include: nutrients, and in southern California, at least, pollution. These influences are often variable, and change with season and location. Many changes in population structure have not been determined.

The inner limit of a kelp bed is reported (North 1971) to be controlled by wave action. In calm, protected areas, Macrocystis beds occur as shallow as two or three meters, or even appear intertidally. Along open coasts, the inner limit usually is at depths of five to ten meters. The inshore edge of the bed is often composed of younger plants, because periodic adverse conditions, such as storms, often prevent the adult population from becoming fully established.

Wave action is particularly important in central California where winter storms tear loose large sections of kelp beds, causing large seismic fluctuations in kelp forest distribution and in their shapes and sizes.

The role of competitors in limiting the inner distribution of Macrocystis beds appears less important than that of surf, but no doubt has some influence. The algae shoreward to Macrocystis beds are characterized by having superior attachment mechanisms which can withstand wave action. In central California this area is dominated by the brown alga Cystoseira. Cystoseira tends to be replaced by the feather-boa kelp Egregia (Burge and Schultz, 1973), often in association with the other kelp form, Nereocystis. Surf grass (Phyllospadix spp.) is often dominant in even shallower water.

According to North (1971), the outer limit of kelp beds is probably determined by light intensity at the bottom. In turbid waters, beds are

limited to depths of 15 to 20 meters, while in clear waters they often occur at depths of 25 to 30 meters. In central California, giant kelp beds are typically sharply defined, especially on the outer seaward edges. Due to the general steepness of the shoreline, kelp beds form narrow bands paralleling the shorelines, limited to a relatively narrow euphotic rocky zone (Miller and Geibel, 1973). The fact that the outer edge of kelp beds is typically even, whereas the inner shoreward edge is usually irregular, has caused the hypothesis that a single, fairly constant factor limits Macrocystis at the outer border while several interacting or variable factors control the inner edge. Some attached algae occurs at or even past the outer edge of the Macrocystis zone. In central California this niche is often occupied by the bull kelp Nereocystis.

Although kelp beds look very much alike at the surface, there are usually striking differences on the sea floor. The composition of associated algal species varies with location in accord with environmental factors including substrate, exposure, upwelling, temperature, depth, etc. (Dawson, 1966). Where the surface canopy is not extremely thick or in open patches within the bed, there occurs a multilayered vegetative cover (McFarland and Prescott 1959) (Dawson 1966) which is very broadly similar to a multilayered tropical forest. Below the thin surface canopy Dawson (1966) described an intermediate layer consisting of species that are stalked or tree-like, having heavy, erect stipes which hold the fronds off the bottom.

The third or bottom layer consists of short forms of brown, green and red algae in varying degrees of profusion and array of forms. Dawson (1966) reported that jointed corallines are the most ubiquitous, growing both outside and in the deep shade of the canopy. Crustose calcareous corallines occur as pink layers on bottom rocks and often cement together pebbles, shells, and sand to form nodules and areas of rough pavement which presumably can increase the suitable area for kelp attachment. According to North (1971) the associated low-lying filamentous and encrusting community tends to be more profuse and better developed in central California.

Another habitat is attachment on the kelp itself. The "hard" substrate created by kelp plants greatly increases the habitat available to filter feeding animals (invertebrates). The Macrocystis assemblage is unique in having large surface areas throughout the water column for the attachment of sessile invertebrates. Other large brown algae, such as Nereocystis, concentrate the laminae surfaces to only one region of the water column. Thus, in kelp beds there is intense utilization of the phytoplankton population, from surface to bottom, by the sessile filter-feeding invertebrates which encrust the solid kelp surfaces.

Because the lifespan of a kelp blade is only two to four months, the sessile fauna colonizing these surfaces are also short lived. North reports that these species are primarily forms that settle, develop, and

reproduce rapidly. Due to the lack of information on the length of time required to reach reproductive maturity in most California invertebrate species, however, it may be a little premature to assume that many of the species inhabiting kelp blades actually complete their life cycle under these circumstances. For many sessile species the kelp blade may be a habitat for juveniles which do not live long enough to obtain maturity, and the kelp plant lends nothing to aid in the direct propagation of the species. The brood stock must come from areas other than on the kelp plant itself. Other, probably the majority, sessile species do have short enough life cycles to be completed within the lifespan of the kelp blade. Generally these colonizers are small, usually microscopic, or just visible to the naked eye. According to North (1971), the kelp assemblage, therefore, tends to differ from other benthic communities by having a large portion of the herbivore population small in size. This allows the development of large populations of small carnivores in midwater which, in turn, provides a mechanism of telescoping the food chain. Further, because the encrusting invertebrates are attached to a macroscopic object they can be efficiently preyed upon by fairly large carnivores in spite of their small size, and there is evidence that certain fishes utilize these encrusting forms for food.

The heavy shade of the sea floor created by the kelp canopy causes a drastic reduction of the standing crop of shorter algae. This barren substrate becomes overgrown with sessile invertebrates, frequently clustered on top of each other to depths of ten to twenty centimeters. Because of the more enduring substrate, longer-lived species are found. Most of these bottom sessile invertebrates are filter feeders and presumably have microscopic organic detritus of kelp origin in addition to phytoplankton available to them.

The profuse holdfast (bottom attachment structures) community is another important part of the kelp forest. Kelp is an important supply of organic matter to the nearshore community when it becomes uprooted and drifts releasing particulate and dissolved organic matter as it does.

Bull Kelp. The two most ecologically significant differences between Nereocystis and Macrocystis are the former's annual life cycle and the fact that all its blades originate at the same level from a single large pneumatocyst. The shorter life cycle would tend to decrease the number of longer lived sessile benthic invertebrates located under the forest, particularly associated with the holdfasts, and increase the competition for space with algae during the period of the year when the kelp are at their lowest abundance. This would be particularly true in clear or shallow waters. Since the fronds originate at only one level in the water column, the vertical area available to sessile encrusting algae and invertebrates is reduced in comparison with Macrocystis which has fronds containing numerous blades throughout the water column.

Gotshall et al. (1974) reported Nereocystis occurred to a depth of 15

meters (50 feet) and was present on about one-third of the area around Point Arena. The two most important brown algae of the midlayer understory were Desmarestia munda and Laminaria setchelli.

Burge and Schultz (1973) observed Nereocystis beds in the Diablo Cove region. Dense Nereocystis beds developed to depths of 12 meters (40 feet) after which coralline red algae dominated the hard bottoms.

Burge and Schultz (1973) concluded that annual variations in density of Nereocystis beds were controlled by variations in substrate, sedimentation, light penetration, grazing and water temperature. The annual change in the location of Nereocystis beds appears to be fairly significant.

Nereocystis is an annual, but tends to be nearly biannual in the southern part of its range in the warmer water of most of central California.

Burge and Schultz (1973) studied the life history of Nereocystis in the Diablo Cove area of central California for several years. The large life form (sporophyte generation) normally occurred in midspring (late March or early April) and the first pneumatocysts (floats) usually reached the surface in May. The sporophytes grew at a rate of 13 to 16 centimeters a day until reaching the surface. After this point, growth slowed and eventually ceased.

Mature sorri (spore producing structures) were observed as early as June, with peak maturation in September. No mention was made of the small life form stage (gametophytic) generation. New plants initiate through August, and sorri develop and mature through March of the following year. Thus, there is at least sporadic sorrus development and apparent zoospore release during all but two or three months of the year. This may have contributed to the observed overlap of sporophyte generations.

The first Pacific storms during October or November initiate the kelp bed decline. Although a small number of the population lasted over the winter (from one to five percent were still present the following spring) the majority did not survive, and the bottom became littered with stipes during late fall, winter, and early spring.

Further north around Point Arena in Mendocino County, Gotshall et al. (1974) reported a complete absence of Nereocystis during the winter Davidson period. This would indicate that Nereocystis at this latitude has a completely annual life cycle with no overlapping of generations. The cycle may be somewhat delayed in comparison with Diablo Cove although the basic sequence is very similar. During the summer upwelling period, the Nereocystis population was at its greatest rate of increase, and reached its greatest abundance during the fall oceanic period.

North of Point Arena Nereocystis becomes more sporadic in its year to year abundance and even occurrence. North of Cape Mendocino, both Nereocystis and the depth of the photic zone decrease, causing the kelp to be limited to shallow water. Its annual presence becomes even more sporadic and may be present only for about six months a year, and abundant only during the summer (DeMartini, personal communication).

Kelp harvesting, primarily for giant kelp, is an important multi-million dollar industry in California. Although the principal harvest is taken from southern California, significant kelp harvests are conducted as far north as Point Ano Nuevo. The California Department of Fish and Game has inventoried 24 kelp beds between Point Arguello and Point Montara. These beds cover an area of 4014.6 hectares (9920 acres) and account for 22 percent of the inventoried beds in California. From 1974 through 1978, the annual kelp harvest in this area (central and northern California) has averaged 4.9×10^6 kg (5470 wet weight tons). During the same period of time, the central and northern California harvest accounted for about 3 percent of the total California harvest which averaged 1.45×10^8 kg (160,305 wet weight tons) per year. Increased harvesting and expansion of present harvest areas will probably be the future trend in central California because the resource yield is nearly at an upper limit in southern California while its demand is increasing every year (U.S. Dept. of the Interior 1977).

The location of kelp beds on Visual No. 5 was taken from Bell and Ally (1972) except the two Macrocystis beds near Van Damm State Park and Bear Harbor were from the personal communication of DeMartini (1976). The beds between Cape Mendocino and Fort Ross are notated differently than the rest of the beds because they were classified differently in the Appendix by Bell and Ally. The beds of this area were classified as sparse kelp bed areas rather than discrete beds as indicated elsewhere. In reality all notated areas represent habitat and areas where kelp have occurred at various periods, but may not actually contain kelp throughout the entire area at any specific moment.

The kelp representation on the visual is about 10 years old and the distributions have changed in some or many areas. Glenn R. Van Blarican of USFWS in San Simeon was kind enough to inform us of the following errors.

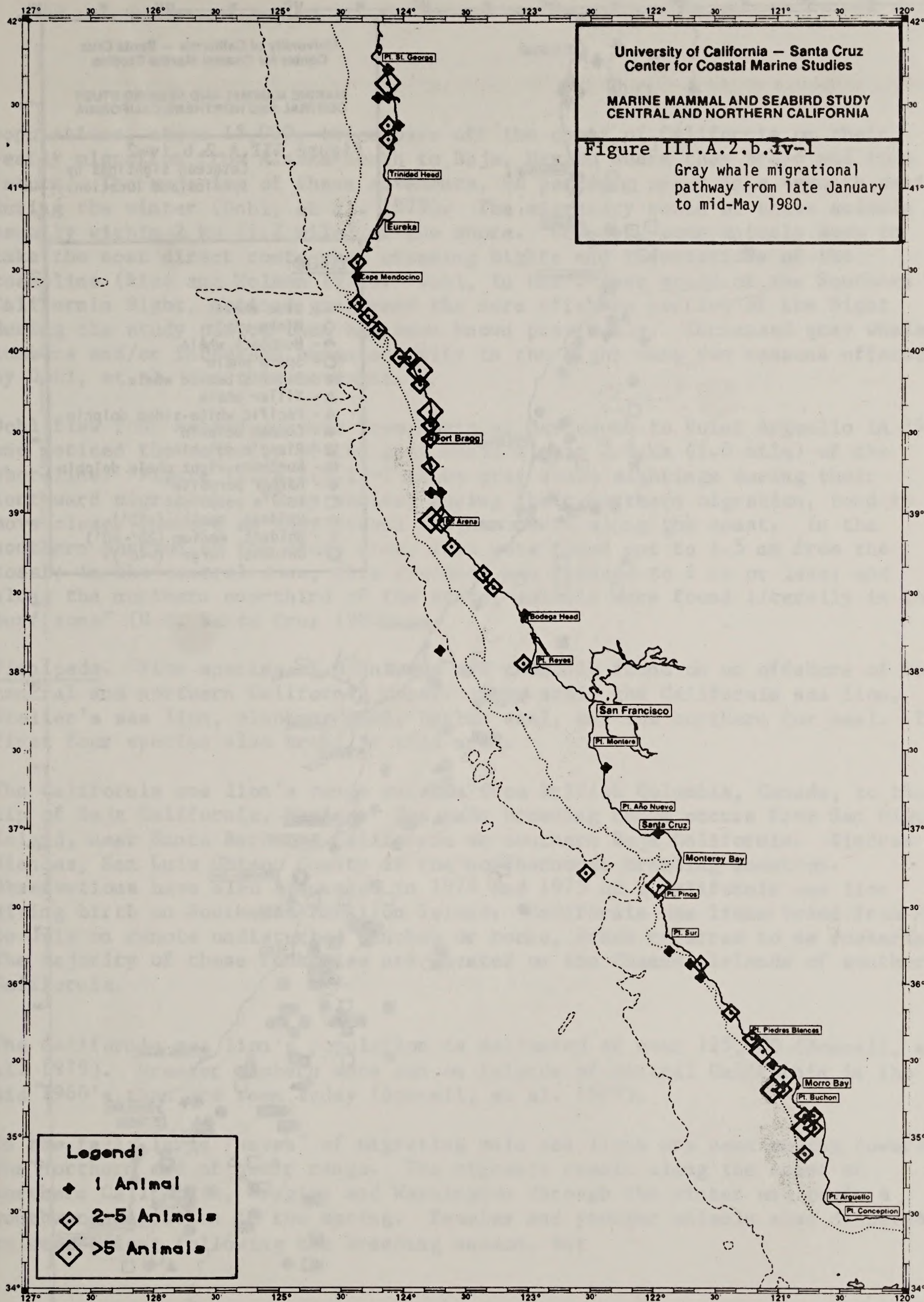
The visual shows the kelp forests between Santa Cruz and Pt. Ano Nuevo to be dominated by giant kelp (Macrocystis). In fact, giant kelp stands in this area are patchy and are interspersed with significant stands of the bull kelp (Nereocystis). In addition, the relative abundances of these kelps can change dramatically from year to year depending on the severity of winter storm seasons. The visual shows the Pt. Buchon (just south of Morro Bay) area to have large stands of both giant kelp and bull kelp. In fact, bull kelp is predominant in this area, with giant kelp occurring only in scattered patches at this time.

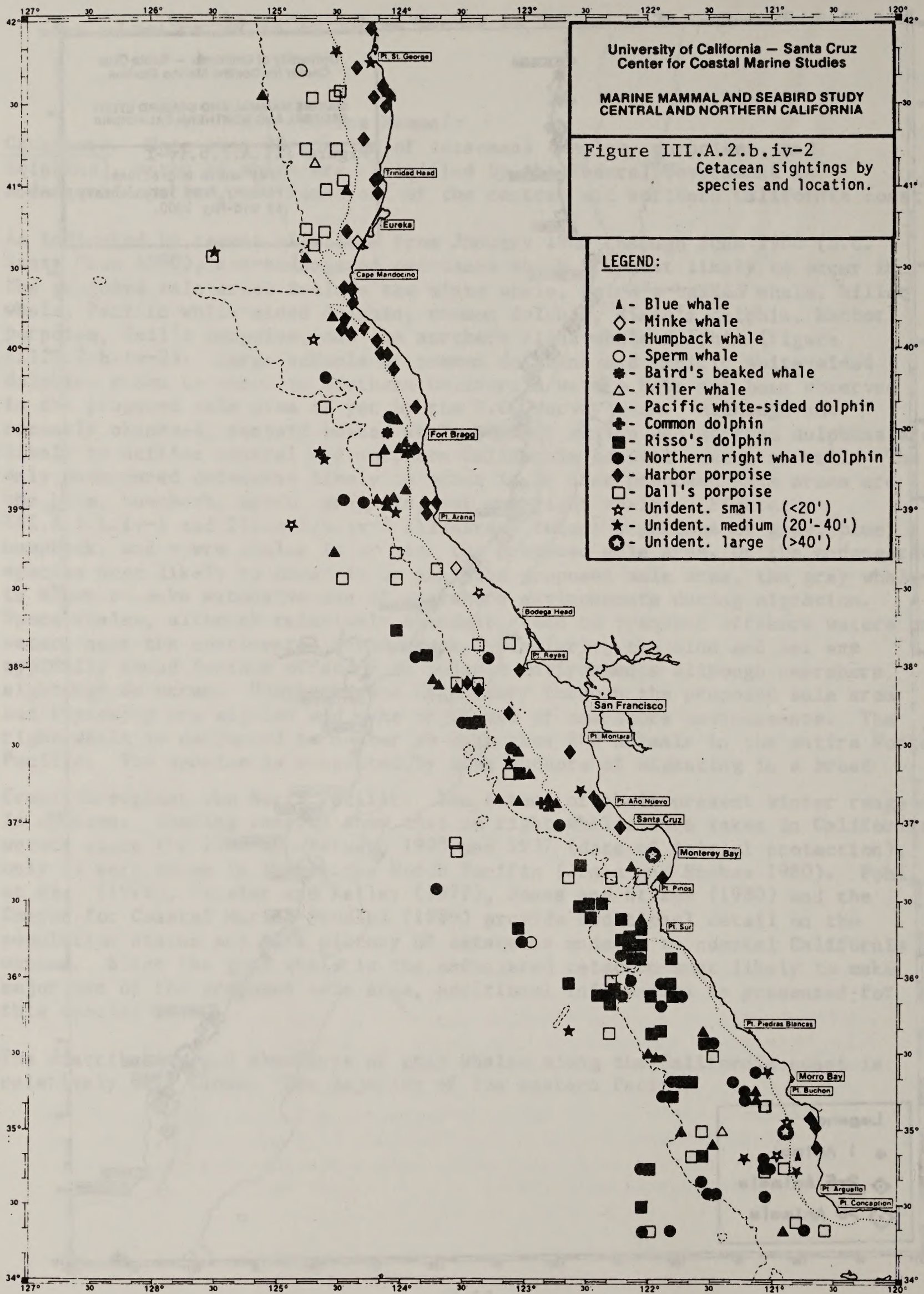
iv. Marine Mammals

Cetaceans. More than 22 species of cetaceans (whales, porpoises, and dolphins), seven of which are classified by the Federal Government as endangered species, are found off of the central and northern California coast.

As indicated by recent sightings from January 1980 through June 1980 (U.C. Santa Cruz 1980), non-endangered cetaceans which are most likely to occur in the proposed sale areas include the minke whale, Baird's-beaked whale, killer whale, Pacific white-sided dolphin, common dolphin, Risso's dolphin, harbor porpoise, Dall's porpoise, and the northern right-whale dolphin (Figure III.A.2.b.iv-2). Large schools of common dolphins and Pacific white-sided dolphins known to occur in southern California waters have not been observed in the proposed sale area as yet by the U.C. survey team. Although not recently observed, certain beaked whales, pilot whales and striped dolphins are likely to utilize central and northern California coastal waters as well. The only endangered cetaceans likely to occur in or near proposed sale areas are the blue, humpback, sperm, gray, fin, sei and right whales. Figures III.A.2.b.iv-1 and III.A.2.b.iv-2 illustrate recent sightings of gray, blue, humpback, and sperm whales in or near the proposed sale area. Of the endangered species most likely to occur in or near the proposed sale area, the gray whale is known to make extensive use of nearshore environments during migration. Sperm whales, although relatively abundant, tend to frequent offshore waters or waters near the continental shelf break. Similarly, the blue and sei are typically found further offshore in pelagic environments although nearshore sightings do occur. Humpbacks are transitory through the proposed sale area and typically are sighted and make major use of nearshore environments. The right whale is estimated to number no more than 200 animals in the entire North Pacific. The species is suspected by some authors of migrating in a broad front throughout the North Pacific. The extent of their present winter range is unknown. Whaling records show that no right whales were taken in California waters since the 1920's. Between 1905 and 1937 (date of initial protection), only 24 were taken in the entire North Pacific (Jones and Stokes 1980). Pohl, et al. (1978), Winzler and Kelley (1977), Jones and Stokes (1980) and the Center for Coastal Marine Studies (1980) provide additional detail on the population status and life history of cetaceans endemic to coastal California waters. Since the gray whale is the endangered cetacean most likely to make major use of the proposed sale area, additional information is presented for this species below.

The distribution and abundance of gray whales along the California coast is relatively well known. The majority of the eastern Pacific





populations, about 15,000, twice pass off the coast of California on their yearly migration from Alaska south to Baja, Mexico where they breed and then return. The majority of these movements, 98 percent, occur in a 4-month period during the winter (Dohl, et al. 1979). The migratory route of these animals is usually within 2 km (1.2 mile) of the shore. However, some animals seem to take the most direct route when crossing bights and indentations of the coastline (Rice and Wolman 1971). Dohl, in his 3-year study of the Southern California Bight, noticed gray used the more offshore portion of the Bight during the study period than had been known previously. Increased gray whale numbers and/or increased human activity in the Bight were two reasons offered by Dohl, et al. for this movement.

Dohl flew four aerial surveys from Monterey Bay south to Point Arguello in 1977 and noticed the majority of the gray whale within 2.3 km (1.5 mile) of the shoreline. Figure III.A.2.b.iv-1 shows gray whale sightings during their northward migration. "Gray whales, during their northern migration, tend to move closer inshore as they travel farther north along the coast. In the southern portion of the study area, they were found out to 1.5 nm from the coast; in the central zone, this distance was reduced to 1 nm or less; and along the northern one-third of the state, animals were found literally in the surf zone" (U.C. Santa Cruz 1980).

Pinnipeds. Five species of pinnipeds are commonly found on or offshore of the central and northern California coast. They are: the California sea lion, Steller's sea lion, elephant seal, harbor seal, and the northern fur seal. The first four species also breed in this area.

The California sea lion's range extends from British Columbia, Canada, to the tip of Baja California, Mexico. Its main breeding range occurs from San Miguel Island, near Santa Barbara, California to southern Baja California. Piedras Blancas, San Luis Obispo County is the northernmost breeding location. Observations have also been made in 1974 and 1975 of a California sea lion giving birth on Southeast Farallon Island. California sea lions breed from May to July on remote undisturbed beaches or rocks, areas referred to as rookeries. The majority of these rookeries are located on the Channel Islands of southern California.

The California sea lion's population is estimated at over 125,000 (Bonnell, et al. 1979). Greater numbers were seen on islands of central California in the mid 1960's than are seen today (Bonnell, et al. 1979).

In the fall, large "waves" of migrating male sea lions are seen moving towards the northern end of their range. The migrants remain along the coast of northern California, Oregon and Washington through the winter and begin a southward migration in the spring. Females and younger animals also disperse to some extent following the breeding season, but

remain within the breeding range (Bonnell, et al. 1979).

The Steller's sea lion in North America breeds from the Pribilof Islands, Alaska to San Miguel Island, California. Populations also occur in the western Pacific. In 1961, the world population was estimated at 240,000 to 300,000 animals of which about 7,500, (2.5-3.0 percent of the population) were found south of the Canadian Border (Bonnell, et al. 1979).

The Steller's sea lion breeding season extends from late May to early July. Their rookeries are found on isolated offshore rocks and islands along most of California's coastline, generally north of San Francisco, with a major colony (2,000 animals) occurring at Ano Nuevo Island.

The northern fur seal's world population is about 1.8 million. Its range extends from the Bering Sea, south to the coastal waters of the eastern and western Pacific near San Diego, California and Honshu, Japan, respectively. Most of their breeding areas are north of the 55° parallel. In 1968, a breeding colony of northern fur seals were found on San Miguel Island, near Santa Barbara, California. Presently, that population is estimated at 4,000 animals (Bonnell, et al. 1978). From January through June, migrant northern fur seals (mostly adult females) are quite common off the California Coast (Fiscus and Kajimura 1969). Visual Errata Sheet No. 3 (Figure No. 3) portrays recent sightings of this species. Sightings were scattered along the length of the coast between 15 and 60 nm offshore. No areas of clearly greater abundance were identified.

The world population of northern elephant seals is estimated at 64,000. They breed from the Point Reyes peninsula, near San Francisco to Isla Natividad in Baja California. During the non-breeding season, March-November, animals range north, and some go as far as southern Alaska (Bonnell, et al. 1979).

The two major colonies of central California are located at the Southeast Farallon and Ano Nuevo Islands with 1978 estimated totals of 580 and 4,588 animals, respectively (Bonnell, et al. 1979).

Bonnell has estimated the California population of harbor seals at 7,500 animals (U.C. Santa Cruz 1980). Nearly 75 percent are found along the central and northern California coast. The range of the harbor seal (Phoca vitulina richardi;) extends from the eastern Bering Sea south to southern Baja California.

Harbor seals haul out on most isolated beaches, rocks and mud flats where they may be free from disturbances from other pinnipeds and/or man (Bonnell, et al. 1979). Large numbers of harbor seals occur in the many bays of this study area, particularly in San Francisco and Humboldt Bays. On the coast, large numbers, in the hundreds, are known to occur on the Point Reyes peninsula, near Mistake Point in Mendocino County,

and near Morro Bay. Visual Errata Sheet No. 3 (Figures No. 1 and 2) portrays recent sightings of this species (U.C. Santa Cruz 1980).

Sea Otters. The southern sea otter's main range extends from Soquel Point, Santa Cruz County, south to Shell Beach, near Pismo Beach, San Luis Obispo County with highest population densities at the ends of their range (see Figure II.B.7.a-2). They generally inhabit areas inside the 18 m (60 foot) depth contour where kelp and their invertebrate food supply is found. The southern sea otter population numbers fewer than 2,000 (1,443 estimated in 1979) and is slowly expanding its range. Sightings of sea otters have been made in recent years near the Channel Islands in southern California and off of Ano Nuevo Island, north of Santa Cruz. The breeding population of the southern sea otter is located between Capitola, Santa Cruz County, and Shell Beach, San Luis Obispo County.

Sea otters are important in structuring nearshore communities, particularly kelp forest habitats. Sea otters are known to limit densities of herbivorous invertebrates. Deduction of densities of sea urchins by otters has produced profound effects upon kelp populations and associated species (VanBlaricom and Jameson 1980).

v. Birds: An artificial grouping of diverse and abundant avian fauna of the central and northern California coastal waters has been used to facilitate this discussion. The groups to be discussed are: 1) Oceanic Group, 2) Coastal Group, 3) Shorebird Group, and 4) Bay, Estuary, and Lagoon Group. Nesting seabirds and other significant bird habitats are also covered. Table III.A.2.b.v-1 gives preliminary results of University of California, Santa Cruz aerial survey work (U.C. Santa Cruz 1980).

This discussion will include: the type of birds present in the grouping, a rough estimation of the abundance, locations in central and northern California, in addition to special topics such as feeding and nesting areas. (See Page, et al. 1977) for a much more thorough discussion of the coastal birds of central and northern California.

Oceanic Group. Members of this group are: tubenoses; albatrosses, fulmers, shearwaters, and storm petrels; jaegers and skuas and some members of the gull family; alcids; common murre, tufted puffin and auklets. Most of these birds spend most of their lives at sea, returning to land at isolated coastal nest sites only to breed.

Some of these species form huge flocks, numbering up to the tens of thousands (Briggs, et al. 1979). In the fall, nearly all of the world's population of ashy storm petrels are found near the Monterey Subsea Canyon, Monterey Bay (Page, et al. 1977). Most birds of the Oceanic Group can be found seaward of the coast along most of the study area but tend to congregate in certain areas. Congregation localities, utilized for feeding and resting, are thought to include the Eel River Canyon, Mendocino Ridge-Gordo Escarpment, Gulf of the Farallons, and the Monterey Canyon (Page et al 1977) (see Visual erata sheet No. 3, Figures 8 and 9).

Coastal Group. Included in this group are the loons and grebes, pelicans and cormorants, phalaropes, sea ducks and gulls, and terns. These birds can be found along the coast of most of the study area, usually quite close to shore. These birds, like some birds of the Oceanic Group, may at times be found in congregations numbering in the thousands (see Visual erata sheet No. 3). The Brown Pelican, an endangered species, is included in this group.

Shorebird Group. Included in this group are the avocets, plovers, sandpipers and the black oystercatcher, which are associated with the shore. They can be found along the shoreline of most undisturbed areas of the central and northern California Coast where they feed on various invertebrates near the surf line.

Bay, Estuary, and Lagoon Group. Included in this group are the waterfowl, shorebirds, grebes, herons and egrets, and many water associated upland species such as some sparrow, blackbird, warbler and wren species. Table III.A.2.b.v-2 lists the major bays, estuaries, and

TABLE III.A.2.b.v-1

COMPARISON OF DOMINANT SEABIRD SPECIES BY AREA AND BY MONTH

North = Point Arena to Oregon Border
 Central = Point Sur to Point Arena
 South = Point Conception to Point Sur
 Nearshore Waters refer to those within 5 km of the coast
 Source U.C. Santa Cruz, 1980

	<u>Offshore</u>	<u>Nearshore</u>
<u>January and February</u>		
NORTH	Common Murre, Black legged Kittiwake, Fork-tailed Storm-Petrel, Rhinoceros Auklet, Herring Gull	Common Murre, Western Gull, Cormorants, Western Grebe, Surf Scoter
CENTRAL	Common Murre, Cassin's Auklet, Black-legged Kittiwake, Herring Gull, Rhinoceros Auklet	Common Murre, Western Grebe, Surf Scoter, Western Gull, Cormorants
SOUTH	Black-legged Kittiwake, Cassin's Auklet, Rhinoceros Auklet	California Gull, Herring Gull, Western Gull, Brandt's Cormorant
<u>March</u>		
NORTH	Fork-tailed Storm Petrel, Common Murre, Rhinoceros Auklet	Common Murre, Surf Scoter, Western Grebe, Western Gull, Cormorants
CENTRAL	Black-legged Kittiwake, Western Gull, Common Murre, Rhinoceros Auklet, Cassin's Auklet	Common Murre, Western Grebe, Surf Scoter, Western Gull, Cormorants
SOUTH	Black-legged Kittiwake, Rhinoceros Auklet, Cassin's Auklet	Western Grebe, Western Gull, Surf Scoter, Brandt's Cormorant
<u>April</u>		
NORTH	Sooty Shearwater, Leach's Storm-Petrel, Red Phalarope, Black-legged Kittiwake, Common Murre	Arctic Loon, Western Grebe, Surf Scoter, Northern Phalarope, Western Gull, Common Murre, Cormorants
CENTRAL	Sooty Shearwater, Leach's Storm-Petrel, Red Phalarope, Black-legged Kittiwake, Common Murre, Cassin's Auklet	Arctic Loon, Western Grebe, Surf Scoter, Northern Phalarope, Western Gull, Bonaparte's Gull, Cormorants

TABLE III.A.2.b.v-1 (Cont.)

	<u>Offshore</u>	<u>Nearshore</u>
<u>May</u>		
SOUTH	Sooty Shearwater, Black-legged Kittiwake, Red Phalarope	Western Gull, Bonaparte's Gull, Brandt's Cormorant, Northern Phalarope
NORTH	Sooty Shearwater, Common Murre, Black-legged Kittiwake, Phalaropes	Arctic Loon, Common Murre, Cormorants, Western Gull, Surf Scoter, Western Grebe
CENTRAL	Sooty Shearwater, Common Murre, Black-footed Albatross, Black-legged Kittiwake, Phalaropes	Western Gull, Bonaparte's Gull, Cormorants, Arctic Loon
SOUTH	Sooty Shearwater, Phalaropes	Western Gull, Bonaparte's Gull, Brandt's Cormorant

TABLE III.A.2.b.v-2

MAJOR BAYS, ESTUARIES, AND LAGOONS OF
CENTRAL AND NORTHERN CALIFORNIA
(Arranged Geographically)

Del Norte County

Smith River Delta
Lake Earl

Monterey County

Elkhorn Slough

Humboldt County

Stone, Big and Freshwater Lagoons
Arcata Bay
Humboldt Bay
Eel River Delta

San Luis Obispo County

Morro Bay
Nipomo Dunes and Lake
Santa Maria River Mouth

Sonoma County

Russian River Mouth
Bodega Bay
Estero Americana

Santa Barbara County

Santa Ynez River Mouth

Marin County

Tomaes Bay
Abbotts Lagoon
Limantour and Drake's Esteros
Bollinas Lagoon
San Francisco Bay

San Mateo County

Pescadero Marsh and Estuary

lagoons from Point Conception north to the Oregon border. These areas are important nesting areas for the resident species and are critical to the thousands of birds who utilize these areas during their migration. Raptors such as ospreys, bald eagles, and peregrine falcons are frequently found at many of these areas. San Francisco Bay, Elkhorn Slough and Morro Bay have endangered California clapper rail and the California Least Tern. The California Black Rail, listed by the State as a rare species is found at San Francisco and Morro Bays. The Black brant is an important waterfowl species that winters in the large shallow coastal bays such as Humboldt, Tomales, and Morro Bays.

Nesting Seabirds. Thirteen different seabird species breed on isolated spots of the coastline and on offshore rocks and islands (see Visual No. 7 and Visual errata sheet No. 3 figures 5, 6 and 7). These nest areas occur along most of the coast, with heavy concentrations on the Farallon Islands, off San Francisco and Castle Island, Del Norte County. These two areas account for over 50 percent of the nesting seabirds of California.

The U.S. Fish and Wildlife Service (FWS) has completed (for BLM) the first year of a two-year study of nesting seabirds and their seasonal use of central and northern California for the 1979 breeding season. Year I results have been summarized on Visual No. 7. Seabird utilization of the coastal rocks, islands and headlands in the winter months 1979-1980 will also be surveyed by the FWS.

Other Significant Bird Habitats. Large concentrations of ospreys occur at the Usal Creek Mouth, Mendocino County, and in Sonoma County on a stretch of coastline from Stillwater Cove to Salt Point and the Russian River Mouth. The Garcia River Mouth, Mendocino County, is notable for its several hundred whistling swans that regularly winter there. The peregrine falcon has been observed in a number of locations along the coast.

vi. Terrestrial Vegetation and Animals: The terrestrial vegetation of coastal California from Point Conception to the Oregon Border is diverse. It ranges from the usually dry 30 cm (12 inches) of rainfall of the grassland and coastal sage scrub communities in the south, to the usually wet redwood and douglas fir forest, 200 cm (80 inches) of rainfall to the north.

The wildlife species associated with these communities are also diverse. Over 200 species of birds (Page, et al. 1977) and over 100 species of mammals are present in this area (Williams 1977). There are 27 species of reptiles and amphibians (Williams 1977).

vii. Estuaries and Wetlands: This treatment of estuaries and coastal wetlands is divided into a general discussion of these habitats followed by a listing and summary characterization of estuaries and coastal wetlands found in central and northern California.

Estuaries and coastal wetlands are summarized by the California Department of Fish and Game (CFG) (1973), in CFG papers on individual bays (1970, 1972, 1973, 1974a, 1974b, 1975, 1976) and the BLM-USFWS characterization report by Jones & Stokes (1980). The numerous other references on estuaries of the area are scattered throughout the BLM Summary of Knowledge papers, cited above.

Estuaries are bodies of water which range in size from streams through large bays which communicate with the sea through usually constricted openings. The openings of many estuaries are closed to the sea for certain periods of time. Most have salinity gradients, being nearly freshwater near the head, where a freshwater stream typically enters and close to seawater near the entrance into the sea at the mouth. Estuaries themselves are highly productive and important habitats for both transients and full time residents, who belong to nearly every major plant and animal taxonomic group. Many birds are dependent upon the highly productive bays for all or part of their life cycles. Some vegetation such as Cordgrass (Spartina sp.), pickleweed (Salicornia sp.) and eel grass (Zostera sp.), occur almost exclusively in estuaries and form salt marshes and eel grass beds, which are some of the most productive habitats known in nature. The mud flats are rich in invertebrates, including clams, which are important to sportsfishermen. Fish and mobile invertebrates occur in the channels as well as over mud flats. Estuaries are also very important to the continental shelf ecology in central and northern California, serving as spawning or nursery grounds for marine fish and invertebrates, habitat for many oceanic birds, and as suppliers of nutrients to the near shore environment.

No two estuaries are alike and some of the generalizations stated above and below are not true for certain estuaries. Nevertheless, estuaries typically have certain types of major habitats which are occupied by most of the same dominant species, or at least ecological equivalents, even though the distributions and relative amounts of these habitats and associated species (particularly those with smaller populations) may differ.

The following overview of the habitats typical of the estuaries in central and northern California was taken primarily from the final draft of Jones & Stokes (1980); although the habitat classification was slightly modified to follow that used by California Fish and Game (1973). The major habitats of estuaries are: open water, tidal flats, including mud flats and sand flats, and eel grass subtidal areas. Other important areas are the hard or rocky bottoms. Of course, the tidal flats grade into subtidal sand and mud bottoms when not inhabited by eel grass.

These areas are also rich in animal life and contain the same types (although some different species) as the intertidal flats. These areas can be very important fish feeding areas, as is indicated below in the discussion of the open water habitat.

The tidal flat communities (sand and mud) are dominated by similar types of organisms. The primary producers are algae, including both microscopic diatoms and macroalgae (mud flats). The invertebrate fauna is characterized by two types of organisms: those living on the substrate (epifauna) and those living in the substrate (infauna). The epifauna includes snails, nematodes, crustaceans, and polychaete worms. The infauna includes bivalves, polychaete worms, crustaceans, and echiuroid worms. The fish community associated with sand and mudflats consists largely of bottom fish, including flounders, gobies, rays, and sharks. A number of species of birds feed intertidally, especially on mudflats and during low tide.

The distribution of the fauna of the intertidal shore is determined by tidal submergence. Two major zones may be identified. The lower zone occupies the area between mean lower low water (MLLW) and mean higher low water (MHLW) and is dominated by suspension feeders adapted to longer submergence times. The upper zone, between MHLW and mean lower high water (MLHW) is characterized by increased times of emergence. Deposit feeders, adapted to feeding on or in the substrate, are typical of this zone.

Mudflat. The problems of respiration and feeding, and the lack of attachment sites in the soft substrate of mud bottoms favor a specialized fauna. The mudflat community is composed of both epifaunal and infaunal organisms. Sunlight is converted into organic matter by the diatoms and algae growing on the surface of the mud. Detritus produced within the community and transported from other habitats provides a major food source. Some herbivorous species and many small organisms graze on the algae. A few predatory species feed upon the mud surface, but most of the community is found within the mud. Adaptations to feeding include: living in burrows and filtering food particles from the water, or ingesting mud and extracting food. The birds and fish that feed on the mudflat may capture food on the mud surface or probe the mud. Most filter feeders construct burrows in the mud, while invertebrate predators feed on the surface of the mudflat or plow through the mud. Most fish that feed on mudflats are bottom fish. Mudflats are extremely important bird feeding areas and are utilized by numerous species.

The mudflat community is visited by many predatory species at different tidal stages. Various fish species remain in deeper channels during low tides, moving onto the mudflats to feed during high tides. The exposure of the intertidal mudflats at low tide allows many bird species to feed there. Shallow subtidal mudflats are also accessible to birds during low tide.

Tidal action carries nutrients from other habitats onto the mudflats.

Detritus imported from the rocky bottom habitat and from the emergent vegetation habitat helps enrich the mudflats. Tidal currents are also important as a means of dispersal for sedentary organisms, which release planktonic larvae to be transported to other habitats or areas by this method.

Sandflat. Shifting of the sandflat substrate generally excludes primary producers from this habitat. The inhabitants of the sandflat community rely upon nutrients imported from other areas. Tidal action carries plankton and suspended organic matter onto the sand flats, supporting the filter feeders and deposit feeders. Organisms are eaten by invertebrate predators, fish, and birds. Organisms migrate into the sandflat community in the same pattern as noted for mudflats. Fish move onto the sandflats to feed primarily during high tide, with birds foraging over the sandflats at low tide.

Open Water - Water Column. The open water community is dominated by pelagic organisms. The primary producers are members of the phytoplankton community, largely single-celled diatoms. The zooplankton community is dominated by copepods, but also includes other crustaceans, and the larvae of mollusks, crustaceans, and fish. Adult pelagic fish include anchovy, herring, smelts, silversides, and several anadromous species. Some of these species use the estuary on a seasonal basis, while others are resident species. A number of birds inhabit or feed in the open water environment. These birds include those that swim on the surface and those that dive from the air.

The open water community relies upon phytoplankton to convert sunlight into organic matter. Members of the zooplankton community feed on phytoplankton and suspended detritus. Phytoplankton and zooplankton are consumed by many fish. Some of the fish may abandon their pelagic habits at times in order to move to the bottom and feed. Open water birds are almost entirely dependent on fish, feeding primarily on pelagic species. Because phytoplankton and zooplankton species have limited swimming abilities, their distribution is largely determined by currents within the estuary. Plankton is carried into several habitats, providing a food supply for many sessile invertebrates. Many species of fish which are usually pelagic may feed on the bottom, often moving onto tidal flats during high tide. A number of birds can use the open water either to feed or simply to rest.

The zooplankton community is an assemblage of many different types of organisms. Zooplankton can be divided into two major components, the holoplankton and the meroplankton. Holoplankters (permanent plankton) complete their entire life cycle as planktonic organisms. Meroplankton spend only a portion of their life cycle as planktonic organisms and include essentially all the important invertebrates of other habitats and many important fish species which utilize estuaries as a breeding ground or nursery ground.

Two important species of pelagic fish are filter feeders, the northern anchovy (Engraulis mordax) and Pacific herring (Clupea harengus)

pallasii). These species feed on both phytoplankton and zooplankton.

Eelgrass Beds. Eelgrass beds may be present on a variety of substrates, occurring intertidally and subtidally. In addition to the quiet waters of an estuary, the primary factors governing the occurrence of eelgrass beds appear to be tidal exposure and light penetration. Eelgrass is not tolerant of extended periods of exposure to air, which determines its upper limit in the intertidal zone. The lower limit is required by light penetration, which is largely dependent on water clarity. In turbid waters, eelgrass beds are rarely found below a depth of 3 to 4 meters.

Sunlight is converted into organic matter primarily by the eelgrass with a lesser contribution by epiphytic diatoms and algae. Many herbivorous species graze directly on the eelgrass or feed on the epiphytes. The root systems of eelgrass trap sediment, including organic detritus. This material, along with dead and decaying eelgrass leaves, supports scavengers and detrital feeders. Some filter feeders exist within the substrate, while others occur as epiphytes on the eelgrass leaves. These organisms feed on plankton and suspended detritus carried into the eelgrass habitat by tidal currents. The various predators feed on the grazers, scavengers, and filter feeders. Eelgrass beds are generally located in the subtidal zone. Constant submergence of the beds favors visitation of this habitat by fish. In addition to seeking food and protection within the eelgrass beds, many fish attach their eggs to the leaves of eelgrass. The Pacific herring (Clupea harengus pallasii), an important commercial species, spawns primarily on eelgrass in Tomales Bay. Other fish, including the jacksmelt (Atherinopsis californiensis) and topsmelt (Atherinops affinis), also attach their eggs to this plant. Several species of snails and nudibranchs lay eggs on the blades of eelgrass.

Eelgrass beds are highly productive. Surplus energy in the form of dead plant leaves is exported to other habitats, including the salt marsh, mudflats, and rocky bottom. The eelgrass beds are efficient in trapping sediment and detritus carried in from other habitats.

Salt Marsh. Intertidal emergent vegetation (i.e., salt marsh) is inhabited by specifically adapted aquatic vegetation and fauna. Sparse to dense stands of grasses, sedges, rushes, and succulent vegetation, varying in height from nearly prostrate to two meters, are the visually dominant life forms.

Vascular halophytes dominate the salt marsh habitat both with respect to standing crop (biomass) and to percentage cover. Two of the most important species in California are California cordgrass (Spartina foliosa) and pickleweed (Salicornia virginica). The former grows along creek banks and elevations from mean high water (MHW) to mean higher low water (MHLW). Salicornia extends from below MHW, nearly to MHHW (Hinde, 1954). It is also found in non-tidal areas, especially in diked marshes or other disturbed habitat.

A second group of producers are the algae. These act both as a food source for lower forms of organisms and as a place of attachment for eggs. They include diatoms, flagellates, and blue-green algae. Larger benthic algae, such as green algae (Enteromorpha) and sea lettuce (Ulva) also contribute to total algal productivity.

Primary consumers use the stored organic compounds of the producers. Through oxidation of these compounds, energy is made available to be directly used by the organism for respiration or it is stored in its tissue for possible later use.

There are four main food chains. One consists of the primary consumers grazing on vascular marsh plants, such as cordgrass, and pickleweed. The herbivores feed directly on the leaves, shoots, and seeds of the plants and include the black-tailed hare (Lepus californicus), the California meadow mouse (Microtus californicus), and the western harvest mouse (Reithrodontomys megalotis), and several species of ducks (Chapman, 1977).

A second grazing food chain is supported by the benthic algae and includes more aquatic than terrestrial organisms. Nematodes, foraminifera, ostracodes, amphipods, annelids, bivalves, and gastropods feed on diatoms and other microscopic algae. Several gastropods, snails and several fish, including topsmelt and longjaw mudsucker, feed on the larger benthic algae.

A third grazing food chain, supported by phytoplankton during periods of tidal submergence, includes herbivorous zooplankton.

The last major source of energy is the detrital food chain, which has been found to possess a greater community energy flow than the grazing food chains (Teal, 1962). Decaying plant material provides the medium and substrate for bacteria and microbiota action. These micro-organisms are food for higher organisms. They also break down complex organic compounds to simpler forms, more usable by other organisms.

Detritus feeders in the marsh are many. Nematodes, ostracodes, many species of insects, and marine macroinvertebrates, such as the polychaete worms, Capitella capitata and Streblospio benedicti, and mollusks and crustaceans such as yellow shore crab (Hemigrapsus oregonensis), fiddler crab (Uca crenulata), and amphipod (Orchestia traskiana) rely on detritus as their major source of nourishment.

The dominant plants of a salt marsh support a diverse, largely terrestrial herbivore community, including herbivorous insects, birds, and small mammals which feed directly on the leaves, shoots, or seeds. However, a substantial portion of the biomass produced is not consumed directly. Oxidation of decaying plant parts occurs by micro-organisms which form a detrital food chain.

The salt marsh is the most important habitat for the food of other habitats of the estuary, particularly the smaller ones without large eelgrass beds. Being highly productive, the marsh exports large quantities of detritus to adjacent ecosystems. Cameron (1972) estimated that 50% of the annual Spartina foliosa production in San Francisco Bay was exported to the rest of the estuary in the form of detritus. The detritus may be transported to adjacent mudflats or other estuarine habitats for consumption by deposit feeders or may remain in suspension where it is available for use by filter feeders and open-water zooplankton.

Some of the detritus reaches the nearshore oceanic areas where it plays a role in the food web there. This contribution is secondary to upwelling in California, however.

Rocky Bottom. Present primarily along headlands in some estuaries, and at the entrances to bays, rocky bottoms are similar in species composition to shallow subtidal and intertidal areas of the oceanic coastal environment. Jetties and other artificial structures in estuaries near large human populations have a similar species composition and add to the areal representation of this habitat with the resulting increase of hard bottom species.

Sunlight is used by plants and algae of the rocky bottom to convert carbon dioxide and nutrients into organic matter. These primary producers are grazed on directly by herbivores, and provide detritus that is both eaten by scavengers in the rocky habitat and exported to other habitats. Phytoplankton and zooplankton, along with suspended detritus, are carried into the rocky bottom habitat by tidal currents and provide food for the various sessile filter feeders of the rocky bottom community. Carnivores feed upon the various grazers, filter feeders, scavengers, and on other predators.

Many organisms move in and out of the rocky bottom habitat. Wading and shore birds, and fish may utilize this habitat during certain tidal stages, birds preferring low tides and fish high tides. These and other predators may be particularly evident in the rocky habitat during calm periods.

The rocky habitat exports detritus in the form of plant and algal particles to other habitats. Plant detritus enters the rocky habitat from other environments. The influx of phytoplankton and zooplankton from the open water habitat is extremely important as food supply.

Rocky intertidal species are discussed further in Section III.A.2.b.i.

The important bays of central and northern California include the Smith River Delta, Klamath River, Limantour and Drake's Estero, San Francisco Bay, Elkhorn Slough, and Bolinas Lagoon. All are separated from the proposed lease areas by some distances. Humboldt Bay, Eel River

Estuary, Bodega Bay, Tomales Bay, and Morro Bay are important estuaries which are essentially adjacent to the lease areas. Some of the more important estuarine rivers adjacent to lease areas are the Mad, Big, Navarro, Russian, Salmon, Santa Maria, and Santa Ynez Rivers. All but the last two rivers serve as salmon spawning streams.

One can also approach estuarine distribution by examining the important estuaries regardless of where they occur in relation to the proposed lease tracts, concentrating on the aspects most critical to oil spill impacts. Of particular importance are the estuary openings, and those organisms regarded as important to man directly.

Estuaries of ecological concern in central and northern California are presented in Table III.A.2.b.vii-1. Estuaries are important ecologically, as they may serve as bird feeding areas, marine fish nursery grounds, and anadromous fish spawning routes. Table III.A.2.b.vii-2 gives the estimated width of opening of these estuaries. Criteria for the inclusion of estuaries on this table were major anadromous fish streams (California Fish & Game, 1973) and the Jones & Stokes (1980) tables labeled Areas of Ecological Concern (Volume IV Watersheds and Basins).

Out of 47 estuaries of concern, 29 (62 percent) occur north of San Francisco. All are considered important bird feeding areas, but northern California estuaries are more important as fish nursery areas and anadromous fish routes. Seventy nine percent of the estuaries north of San Francisco are important nursery areas (vs. 35 percent to the south) while 62 percent of the northern estuaries are important anadromous fish streams compared with 47 percent to the south. More estuaries are open year round in northern California (48 percent) than in central California (24 percent), reflecting the greater amount of rainfall and importance of the estuaries north of San Francisco.

An estimation of entrance widths of important estuaries is shown in Table III.A.2.b.vii-2. The "normal" entrance width was obtained from the openings as mapped on U.S. Geological Survey 7 1/2' quad maps. Maximum openings, obtained from the same source, were estimated based on two assumptions. 1) the entire fronting spit bar may be breached (or washed away) during winter and spring flood conditions coupled with high tide and storms; 2) The entire valley at the mouth may be flooded and open when the entrance lies within a definite valley closely bordered by topographic highs. The former assumption is valid and is typical while the latter rarely occurs, perhaps only occurring during extremely rainy years within several of the estuaries. Therefore, these represent extremely conservative estimates of the maximum flooding possible. The minimum openings and the dimensions of major habitats were obtained from California Fish & Game (1973), Stokes and Jones (1980), Johnson (1972), the State Dept. of Navigation & Ocean Development (1977), California Fish & Game Wetland series, Fish & Game personnel (personal communication) or BLM on-site observations. Estuaries were included in the table

TABLE III.A.2.b.vii-1

ESTUARIES OF ECOLOGICAL CONCERN IN CENTRAL AND NORTHERN CALIFORNIA

<u>Estuary</u>	<u>Opening to Sea</u>	<u>Bird Feeding Area (+)</u>	<u>Important Marine Fish Nursery Grounds (I)</u>	<u>Important Anadromous Fish Spawning Route</u>
Smith River Delta	Open year round	+	+	+
Lake Earl/ Lake Talawa	Intermittently open	+	+	+
Klamath River	Open year round	+	+	+
Redwood Creek	Intermittently open	+	+	+
Stone Lagoon	Intermittently open	+	+	+
Dry Lagoon	Intermittently open	+	-	-
Big Lagoon	Intermittently open	+	+	+
Mad River	Intermittently open	+	+	+
Humboldt Bay (including Arcata Bay)	Open year round-- constant width, by jetties	+	+	+
Eel River	Open year round	+	+	+
Mattole River	Intermittently open	+	-	+
Little River	Intermittently open	+	-	+(minor)
Ten Mile River	Intermittently open	+	+	+
Noyo River	Open year round width permanent due to jetties	+	+	+
Big River	Open year round	+	+	+

TABLE III.A.2.b.vii-1 (Cont.)

Albion River	Open year round	+	+	+ (minor)
Navarro River	Open year round (nearly closes)	+	+	+
Garcia River	Open year round	+	+	+
Gualala River	Intermittently open	+	+	+
Russian River	Open year round	+	+	+
Salmon Creek	Intermittently open	+	-	minor
Bodega Bay	Open year round constant width maintained by jetties	+	+	-
Estero Americano	Intermittently open	+	+	-
Estero San Antonio	Intermittently open	+	+	-
Tomales Bay	Open year round	+	+	+
Abbotts Lagoon	Intermittently open	+	-	-
Drakes Estero/ Limantour Estero	Open year round	+	+	+ (minor)
Balinas Lagoon	Open year round	+	+	+ (minor)
Rodeo Lagoon	Intermittently open	+	-	+ (minor)
San Francisco Bay complex	Open year round	+	+	+
San Gregorio Creek	Intermittently open	+	-	+ (minor)
Pescadero Creek	Intermittently open	+	+	+

TABLE III.A.2.b.vii-1 (Cont.)

Gazos Creek (steelhead)	Intermittently open (open most of year)	+	-	+
Scott Creek	Intermittently open	+	-	+(minor)
Baldwin Creek Ponds	Intermittently open	+	-	+(minor)
Corcoran Lagoon/ Moran Lake	Intermittently open	+	-	+(minor)
Wilder Creek Pond	Intermittently open	+	-	+
San Lorenzo River	Open year round	+	-	+
Watsonville Slough/Pajaro River	Open year round	+	-	+
Elkhorn Slough complex	Open year round constant width maintained by jetties	+	+	-
Salinas River	Intermittently open	+	-(minor)	-
Carmel River	Intermittently open	+	+	+
Little Sur River	Intermittently open	+	+	+
Big Sur River	Intermittently open	+	+	+(steelhead)
Morro Bay	Open year round constant width maintained by jetties	+	+	+
Santa Maria River	Intermittently open	+	-	-
Santa Ynez River	Intermittently open	+	-	-

TABLE III.A.2.b.v11-2

WIDTH OF ENTRANCE AND AREAL DIMENSIONS OF MAJOR HABITATS OF THE
IMPORTANT ESTUARIES IN CENTRAL AND NORTHERN CALIFORNIA
(All numbers are metric - meters and hectores)

ESTUARY	WIDTH OF ENTRANCE		Areal Dimensions of Important Habitat Types					
	NORMAL	MAXIMUM-MIN.	SALT MARSH	MUD FLAT	SAND FLAT	EEL GRASS	OPEN WATER CHANNELS	OTHER
Smith River	50m ^e	3460+ ^{d,f}	47 373	122 93		-	- ^{a,c} 1549 ^b	
Lake Earl/ Lake Talawa	0 ^d	500m ^d - 0 ^d (?)	550 895	-		-	1057 ^{a,c} 142 ^b	
Klamath River	250 ^a	<1000 - 1450 ^d	532	67			1721 ^b	
Stone Lagoon	0 ^{d,g}	1480 ^d - 0 (Beachhead)	69				142 ^b	
Dry Lagoon	0 ^d	500m ^d - 0 (Beachhead)	32				- ^b	
Big Lagoon	0 ^{d,g}	5380m ^d - 0 (Beachhead)	231				354 ^b	
Humboldt Bay	640 ^d	640 ^d - 640 ^d	243+ (16 Freshwater) 202	2916 2025			3645 ^c 1822 ^b	
Eel River Delta	210 480 ^d	4850 ^d - (Beachhead)	283	202			1000 ^{b,c}	
Ten Mile River	125 ^d	550 ^d - 0	27 (18.6+ 8.5 brackish) 13.5	0.9 40	2.4	0.5 ^a	16 ^b	
Big River (narrow) (wide)	65- ^d 375	300 - <65 ^d	38 25+ 23 brackish 18	6	8	0.65 ^a	49 ^b	
Albion River (narrow) (wide)	31- ^d 190	190 - <31 ^d	20	8			30 ^b	
Garcia River	50 ^d	300 - <50 ^d	8				19 ^b	
Gualala River	21 ^d	850 - 0	9				32 ^b	
Russian River	50 ^d	750 - <50 ^d	40				81 ^b	
Salmon Creek	0 ^d	100 - 0 ^d	2				8 ^b	
Bodega Bay	110 ^d	110 - <110	20	202			138 ^b 340 ^b	
Estero Americano	0 ^d	290 - 0 ^d	49				89 ^b	
Estero San Antonio (narrow) (wide)	100 ^d 300	360 - 0 ^d	30				32 ^b	
Tomaes Bay	650 ^d	1950 - <650 (Beachhead)	178	1175			2410 ^b	
Drakes-Limantour Estero Drakes Limantour Combined	340 ^d 130 ^d 400-110 ^d	110 ^d - <340m ^d 4250 - <130m ^d 4850 ^d - <400m	81	235			522 ^b	
Balinas (narrow) Lagoon (wide)	100 ^d - 300	3600 - <100 ^d (Beachhead)	61	292			150 ^b	

TABLE III.A.2.b.vii-2 (Continued)

ESTUARY	Areal Dimensions of Important Habitat Types							
	WIDTH OF ENTRANCE NORMAL	MAXIMUM-MIN.	SALT MARSH	MUD FLAT	SAND FLAT	EEL GRASS	OPEN WATER CHANNELS	OTHER
San Francisco Bay (Pt. Bonita - Land's End) ^d	3600m	-	1296	16848 ^b				
(Golden Gate)	1600m							
San Pablo-Suisun Bays							10449	20218 ^b
S.P.								
Suisun							(salt ponds)	
San Gregorio Creek	45 ^d	200 - <45 ^d						
(Pescadero Cr. - Butano Cr.)								
Pescadero Marsh	100m ^d	240 - 0 ^d	20				30 ^e	
Laguna Creek	0 ^d	200 - 0 ^d						
		(Beachhead)						
Baldwin Creek	0 ^d	200 - 0 ^d						
		(Beachhead)						
Wilder Creek	0 ^d	150 - 0 ^d						
Pond		(Beachhead)						
San Lorenzo River	75-100 ^d	90 - 75 ^d	1 ^b				14 ^b	
Woods Lagoon	100 ^d	100 - <100 ^d						
Schwans Lagoon	10 ^d	50 - 10 ^d						
Cocoran Lagoon/	C.L. 10	80 - 10 ^d	6.5 ^b				4.5 ^b	
Moran Lake	M.L. 10	50 - 10						
Pajaro River/Watsonville Sl.								
(narrow)	300- ^d	450 - <300 ^d	19 ^b				32 ^b	
(wide)	450							
Elkhorn Slough								
(inner)	100 ^d	120 - <100 ^d	583 ^b	170 ^b			218	77 ^{b,c}
(outer exit to	150	150 - 150					(salt ponds)	
complex)								
Moro Coho Slough	80 ^d	80 - 80 ^d						
Salinas River								
(at tide gate)	90 ^d	90 - 0 ^d						
McClusky Slough	0 ^d	100 - 0 ^d	22 ^b				8 ^b	
		(drainage into Pajaro R. Delta)						
Carmel River	5-10 ^d	100 - 5 ^d	15 ^b				1.6 ^b	
Little Sur River	5-10 ^d	100 - 5 ^d						
Big Sur River	30 ^d	150 - <30 ^d						
Morro Bay	200 ^d	200 - <200 ^d	233 ^b	567 ^b			263 ^b	
San Luis Obispo Creek								
(narrow)	30- ^d	100 - <30 ^d	2.4 ^b				9 ^b	
(wide)	100							
Santa Maria River	3-5 ^d	5 - 0 ^d	20 ^b				6 ^e	
Santa Ynez R.	0 ^d	175 - 0 ^d	44.5 ^b				20 ^b	
			10.1				23 ^a	

a Central-Northern California characterization for BLM-USFWS by Stokes and Jones (1980) Draft.

b California Fish and Game (1973) Coastal County Resources

c California Fish & Game Wetland Study Series - see reference.

d USGS 7-1/2" Quad Maps.

e BLM Field Observations.

f California Dept. of Navigation and Ocean Development (1980) - Assessment and Atlas of Shoreline Erosion.

g Johnson (1972) Tidal Inlets of the California, Oregon and Washington Coasts.

if they had major habitat areal extent included in California Fish & Game (1973) or, particularly in central California, appeared to have definite communication with the ocean on the Geological Survey maps.

Data such as these have many limitations and the table represents a rough approximation of the opening widths and areal extent of the major habitats. Nevertheless, many interesting trends are apparent which again show the greater estuarine habitat in northern California and the relative potential ecological importance of the San Francisco Bay system despite its altered condition. The table below shows the total area of major habitat for the areas indicated in hectares.

	Salt Marsh	Tidal Flats*	Open Water
North of San Francisco	3,147	4,199	10,518
San Francisco Bay	1,296	16,848	-
South of San Francisco	966	737	607

*mud and sand flats combined.

Of the habitats listed below San Francisco Bay, over 90 percent occur in Elkhorn Slough and Morro Bay. The difference in bay openings is discussed in Section IV.B.2.g. (Impacts).

c. Endangered Species: Table III.A.2.c-1 lists the Federally listed endangered or threatened species which may be affected by the proposed sale. This list is not inclusive of other endangered, threatened, or proposed endangered or threatened species known to occur in or near coastal areas of California (see Federal Register Vol. 45 No. 77, May 20, 1980) but for which it has been determined that no effects will be sustained as a result of the proposed sale. Such determinations have been made as part of formal and informal consultation of BLM with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service in compliance with Section 7 of the Endangered Species Act of 1973, as amended.

Species proposed for Federal listing or those of concern to state and local authorities (e.g., California rakish Water Snail, California Black Rail, Guadalupe Fur Seal, Garner's Yampak and certain butterflies) have been considered as to whether they are potential receptors of effects of the proposed sale. Of these, the California rakish Water snail, California black rail, and Guadalupe Fur seal would possibly be sensitive to effects of development or production phases of the proposed sale. However, due to relatively low potential for spills or other habitat alteration during exploration phases, it has been determined that the proposed exploratory phases will not significantly affect such species. Consultation with appropriate Federal agencies or State authorities, as necessary, will continue as additional information regarding impact producing agents of later phases becomes available.

The reader is advised to refer to Sections III.A.2.b, IV.B.2.c, and IV.B.2.e for information on the occurrence of threatened and endangered species and potential impacts on such species.

TABLE III.A.2.c-1

FEDERALLY LISTED ENDANGERED OR THREATENED SPECIES
WHICH MAY BE AFFECTED BY THE PROPOSED SALE¹

Species	California Distribution	Status ²
American Peregrine Falcon (<u>Falco peregrinus anatum</u>)	13 territories along coastal Calif. Between Oregon and Mexico	Endangered
Southern Bald Eagle (<u>Haliaeetus l. leuco- cephalus</u>)	Mainly in interior Calif. Some found along the coast	Endangered
California Brown Pelican (<u>Pelecanus occidentalis californicus</u>)	Statewide along coast. Breeding only on Anacapa Island and Scorpion Rock in So. California	Endangered
California Least Tern (<u>Sterna albifrons browni</u>)	San Francisco Bay to Mexico (Breeding)	Endangered
California Clapper Rail (<u>Rallus longirostris obsoletus</u>)	Salt marshes of San Francisco Bay, San Pablo Bay, Napa Marsh and Elkhorn Slough	Endangered
Blue Whale (<u>Balaenoptera musculus</u>)	Offshore	Endangered
Fin Whale (<u>Balaenoptera physalus</u>)	Offshore	Endangered
Gray Whale (<u>Eschrichtius robustus</u>)	Offshore	Endangered
Humpback Whale (<u>Megaptera novaeanglinae</u>)	Offshore	Endangered
Pacific Right Whale (<u>Eubalena glacialis japonica</u>)	Offshore	Endangered
Sei Whale (<u>Balaenoptera borealis</u>)	Offshore	Endangered

TABLE III.A.2.c-1 (Cont.)

Species	California Distribution	Status ²
Sperm Whale (<u>Physeter catadon</u>)	Offshore	Endangered
Salt Marsh Harvest Mouse (<u>Reithrodontomys raviventris</u>)	Marsh areas of San Francisco and San Pablo Bays	Endangered
Southern Sea Otter (<u>Enhydra lutris nereis</u>)	Santa Cruz south to Avila Beach	Threatened
Leather-backed Turtle (<u>Dermochelys coriacea Sechlegeli</u>)	Tropical and sub-tropical seas of west coast; some stray as far north as Vancouver Is., British Columbia	Endangered
Sea Turtle (<u>Caretta caretta</u>)	Offshore	Threatened
Green Sea Turtle (<u>Chelonia mydas</u>)	Offshore	Endangered
San Francisco Garter Snake (<u>Thamnophis sirtalis tetrataenia</u>)	San Mateo County	Endangered
Santa Cruz Long-Toed Salamander (<u>Ambystoma macrodactylum croceum</u>)	Santa Cruz County	Endangered
Smith's Blue Butterfly (<u>Shijimiaeoides enoptes smithi</u>)	Monterey Co. Coastal Dunes	Endangered
San Bruno Elfin Butterfly (<u>Callophrys mossii bayensis</u>)	San Bruno Mountain, San Mateo County	Endangered
Mission Blue Butterfly (<u>Icaricia icorioides</u>)	San Bruno Mountain, San Francisco	Endangered

TABLE III.A.2.c-1 (Cont.)

Species	California Distribution	Status ²
Globose Dune Beetle <u>Coelus globosus</u>	Mendocino, Sonoma, Marin, San Mateo, Monterey, Ventura & San Diego Counties	Proposed Threatened
San Francisco Tree Lupine Moth <u>Grapholitha edwardsiana</u>	San Francisco	Proposed Threatened
Callipee Silverspot Butterfly <u>Speyeria callippea</u> <u>callippea</u>	Alameda, Contra Costa, San Francisco and San Mateo Counties	Proposed Endangered

¹As determined through consultation with U.S. Fish and Wildlife Service and National Marine Fisheries Service in compliance with Section 7 of the Endangered Species Act of 1973, as amended.

²Per Federal Register, 20 May 1980, Vol. 45, No. 97.

d. Proposed Marine Sanctuaries: The Marine Protection, Research and Sanctuaries Act of 1972 (16 U.S.C. 1431-1434) authorized the Secretary of Commerce to designate ocean areas which have a distinctive conservation, recreational, aesthetic, or ecological value as marine sanctuaries, upon concurrence with affected State and Federal agencies and Presidential approval. In 1977, the National Oceanic and Atmospheric Administration (NOAA) of the Department of Commerce requested recommendations of sites that would be appropriate as marine sanctuaries. As a result of this request, there were numerous sites recommended off the coast of California. Presently, there are three areas off the central and southern portions of the California coast which have been designated as active candidates for marine sanctuary status. If a decision is made to proceed with this designation, NOAA must then seek Presidential approval. Within 60 days of such a designation, the Governor of California may stop the inclusion of State waters as part of the designated area. The discussion below describes the resources of each of the three proposed sanctuary areas. (Extracted from NOAA comments on the DEIS for proposed OCS Sale No. 53.)

Point Reyes-Farallon Islands Proposed Marine Sanctuary. The Draft Environmental Impact Statement (DEIS) for the proposed sanctuary was distributed in March 1980. Public hearings were held in May 1980. The Final Environmental Impact Statement (FEIS) is presently being prepared and is scheduled for release in the summer of 1980. It is anticipated that sanctuary designation will occur before the end of this calendar year.

As proposed, the sanctuary would extend shoreward to the mean high tide line or the seaward boundary of the Point Reyes National Seashore. Between Bodega Head and Point Reyes Headlands, the sanctuary extends seaward to 3 nautical miles (nmi) (5.6 kilometers) (km) beyond the territorial waters. The proposed sanctuary also includes the waters within 12 nmi (22.2 km) of Noonday Rock and the mean high tide line on the Farallon Islands, and the waters between these islands and the mainland from Point Reyes Headlands to Rocky Point (just southeast of Bolinas Lagoon). The proposed sanctuary would include Bodega Bay, but not Bodega Harbor.

Significant seabird populations flourish in this area and, historically, have been the most thoroughly studied and protected resource. An extremely large number of nesting pairs (estimated at 100,000 in 1969-70) have been inventoried, probably representing over half of all California's nesting seabirds. The proposed sanctuary contains some of the largest rookeries in the contiguous United States, and at least 12 of the 16 seabird species known to breed on the west coast nest here. Virtually the entire world's population of the ash storm petrel nests here, as well as the world's largest single colony of western gulls. The peregrine falcon and brown pelican, both endangered species, are found in small numbers on the Farallon Islands. Waters around the Islands and along the mainland coast provide rafting habitat and a

foraging area for both seabird and shorebird communities.

A large and varied marine mammal population (some 23 species) has been sighted in the Point Reyes-Farallon Islands vicinity. The cetaceans (whales and porpoises), including several endangered species, pass through the proposed sanctuary on their annual migrations. On and around the Farallon Islands, and along the mainland coast, elephant seals, California sea lions, and harbor seals use the extensive deep- and shallow-water feeding grounds, as well as littoral sites for haul-out and pupping purposes. The fur seal, a recently reappearing species, is a transient.

Complementing marine mammal and seabird populations are marine and anadromous fish stocks, marine plants, invertebrates, and diverse intertidal habitats. Finfish and shellfish, and their associated habitats, have exceptional recreational, commercial, research, and ecological value. With this concentration of highly productive, diverse, and rich living resources over a fairly broad geographic area, the waters around the Farallon Islands and along the Marin County coast are also of high research value. Extensive studies of these marine areas have been, and continue to be, conducted by a number of nearby scientific organizations, e.g., the Point Reyes Bird Observatory.

The recreational opportunities in the waters surrounding the Farallon Islands and off the mainland coast include boating, skin diving, sportfishing, and nature study such as bird and mammal watching.

The regulations proposed for the sanctuary would prohibit all hydrocarbon exploration and development activities anywhere within the sanctuary. Tracts 069 and 073 in the northwestern corner of the Santa Cruz Basin lie partially within the proposed sanctuary boundaries. Any development of the oil and gas resources beneath those restricted portions of the tracts would have to be conducted through directional drilling techniques from outside the sanctuary. NOAA will recommend that the DOI advise the lessees in the notice of sale that oil and gas activities will be prohibited within the boundaries of the sanctuary. Additionally, if DOI determines that it will not be feasible to recover the oil and gas resources from portions of tracts that fall within the sanctuary boundaries through directional drilling techniques, OCZM recommends that those tracts be deleted from the sale.

The proposed regulations will also limit pipeline placement and the passage of certain vessels, including freighters, tankers, barges, and OCS supply vessels within specified distances of the Farallon Islands, Noonday Rock, Bolinas Lagoon, and Areas of Special Biological Significance designated by the State of California. The placement of pipelines will be prohibited within 2 nmi of these sites and vessel navigation and operation within 1 nmi. However, based on comments received, OCZM is evaluating the benefits of extending the latter buffer zone to 2 nmi. The regulations also provide for sanctuary certification

of any permits for pipeline placement in the remainder of the sanctuary.

Monterey Bay Proposed Marine Sanctuary. A schedule for the designation process will be developed in fall 1980. Firm boundary alternatives have not yet been developed. The Monterey Bay marine sanctuary study area stretches approximately 127 miles (237 km) along the central California coast from just north of Point Ano Nuevo south to Point Piedras Blancas. The entire coastline of Santa Cruz and Monterey Counties is included, as well as small portions of San Mateo and San Luis Obispo Counties. The shoreward boundary of the area is the mean high tide line, except at the mouth of Elkhorn Slough near Moss Landing, where the Moss Landing Harbor District's jurisdictional limit is utilized. There is no fixed seaward edge to the study area, although ocean space out to roughly 20 nm (37 km) beyond territorial waters will be included in an evaluation at the resources and human activities within the area.

The major types of marine resources in the study area that provide a basis for this sanctuary designation are marine mammals, seabirds, fish and shellfish, marine flora, and benthic fauna and intertidal organisms. Marine mammals include at least five species of seals and sea lions, 15 species of whales and dolphins, and the California sea otter, which is listed as a threatened species by the U.S. Fish and Wildlife Service because of the population's vulnerability to oil pollution. Sizable assemblages of Brandt's cormorant and the common murre and several other species nest in the region. Dozens of other species, including brown pelicans, gulls, shearwaters, loons, terns, puffins and phalaropes, also concentrate in the area. A broad range of commercial and recreational fish resources is found in the nearshore and offshore areas. Most of the coastline in the region is fringed by kelp beds, which are not only harvested commercially, but also serve as habitats for a variety of fish species including lingcod, cabezon, jack mackerel, salmon, bonito, and rockfish. Rich benthic communities abound throughout the area as well.

Regulations for the sanctuary have not been developed as of July of 1980. Proposed regulations will be included in a forthcoming DEIS. Since the resources here are similar to those found in the other active California sites, it is possible that the activities subject to regulation may also be similar.

Channel Islands Proposed Marine Sanctuary. While this active candidate is not situated within the central and northern California OCS region, the oil spill risk analysis model (OSRAM) conducted for proposed OCS Sale No. 53 indicated that potential oil spills originating from the Santa Maria Basin could affect the proposed sanctuary (Section III.A.1), especially around San Miguel Island, Wilson Rock and Richardson Rock.

Additionally, on March 5, 1980, Anacapa, Santa Cruz, Santa Rosa, San Miguel, and Santa Barbara Islands were designated as a National Park. The Park boundary extends 1 nmi out around each island. The State of California retains ownership of these submerged lands, and has

management responsibility over fisheries in these areas in cooperation with the National Park Service (Ehorn 1980).

The DEIS for the proposed northern Channel Islands and Santa Barbara Island sanctuary was distributed in November 1979. Public hearings were held in January 1980. The final environmental impact statement (FEIS) was released in March 1980. Designation of this sanctuary may occur as early as the fall of 1980.

As proposed, the sanctuary would extend 6 nmi (11.1 km) seaward from the mean high water mark of the following islands and offshore rocks: San Miguel Island, Santa Cruz Island, Santa Rosa Island, Anacapa Island, Santa Barbara Island, Richardson Rock, and Castle Rock.

These islands support a large and diverse community of marine mammals. San Miguel Island is unique in that it is the only island in the northern hemisphere on which six species of pinnipeds haul out. There are some 32 species of marine mammals in the area, including the northern elephant seal, California sea lion, harbor seal, northern fur seal, dolphins, porpoises, and minke, gray and pilot whales. In addition, the area serves as habitat for breeding seabirds. Major rookeries are found on San Miguel and Santa Barbara Islands and offshore rocks. The nearshore waters of all the islands are also heavily used for foraging. This site also contains highly productive kelp beds, commercially and recreationally valuable fish and shellfish, and several transition zone species.

The proposed sanctuary regulations for hydrocarbon operations would allow for exploration and development with additional protective equipment on tracts leased before the effective date of the regulations. Similar activities on tracts leased after the effective date would, however, be prohibited. The proposed regulations are designed to protect the sensitive living resources of the area from oil and gas activities by keeping such activities at a minimum within the sanctuary and by requiring protective oil spill containment measures when drilling and other operations proceed.

B. Human Environment

1. Commercial Fisheries: The California Shelf is a relatively narrow one. The environment of the shelf and its adjacent shoreline area is characterized by: 1) a rugged sea bottom that offers a diversity of habitats, 2) wind and current patterns that cause inshore and offshore upwelling of nutrient-rich deep water, 3) kelp beds that support an abundant variety of life, 4) rocky tidepool areas interspersed with short or extensive sandy beaches, and 5) estuaries and associated wetland areas, including six major bays, and lagoons. There is an extensive coastal stream system that is vital to the maintenance of the coastal system. These streams directly affect the coastal area with respect to anadromous and estuarine fishes and the general productivity of the area (also see section III.A.2.b and Fry 1973).

The region is faunistically important because it constitutes a transitional zone between the three major water masses of the Northeast Pacific: subarctic to the north, central to the west, and equatorial to the south. It is transgressed by the broad California Current. This vast area covers about 60,000 square miles. From an ichthyofauna standpoint, the area is in the "Southern Boreal" zone (Moiseev 1971). However, south of Point Conception, where the southward moving California Current swings offshore, a higher temperature, inshore water mass is created. Here, boreal and subtropical fish and invertebrate species overlap.

California's coastline is rich in fish life. Miller and Lea (1972) list 554 species of nearshore fishes. The 1976 supplement to their publication (California Sea Grant Program and University of California) included 8 additional species. Although some of these fishes are restricted to warm waters south of Point Conception, the majority are found in the area under consideration. When the deep-water fauna not considered by Miller and Lea is added, the total, of course, increases. Table III.B.1-1 lists the 11 largest families found in this area, three of which have great sport or commercial importance. They are the rockfishes, righteye flounders, and surfperches.

The California shelf is extremely high in fish productivity from a world standpoint. Although production over the whole shelf is intermediate compared to the worldwide range (10-3000 kg/km²) (Moiseev, 1971), in parts of the Point Arena Basin fish productivity exceeds 3000 kg/km² and in parts of the Eel River and Santa Maria Basins it exceeds 2500 kg/km² (based on data obtained from California Department of Fish and Game). In spite of its importance as a producer of commercial and sport fishes, the central and northern California shelf area is among the most poorly studied of the shelf areas of the United States. However, there are enough data to generally characterize the commercial fish and invertebrate species of the area and to partially assess the status of the principal stocks.

The pounds and value of the more important commercial fish and invertebrate species caught in waters in or adjacent to the five lease

TABLE III.B.1-1

THE ELEVEN MOST SPECIOSE FAMILIES OF FISHES IN
CENTRAL AND NORTHERN CALIFORNIA^a

Family	Common Name	Number of Species
Scorpaenidae	Scorpionfishes and rockfishes	57
Cottidae	Sculpins	44
Pleuronectidae	Righteye flounders	19
Liparidae	Snailfishes	19
Embiotocidae	Surfperches	18
Agonidae	Poachers	17
Zoarcidae	Eelpouts	17 ⁺
Stichaeidae	Pricklebacks	14
Gobiidae	Gobies	13
Clinidae	Clinids	12
Myctophidae	Lanternfishes	11 ⁺

^aSource: Winzler and Kelly Consulting Engineers (1977)

areas have been compiled for the ten most recent years that this data is available (Table III.B.1-2) Over 10% of the state's flatfish are caught in the Eel River Basin. Salmon, rockfish, sablefish and lingcod are also very important fisheries in this area. From 1972 to 1975 over 10% of the state's salmon were caught in the Point Arena Basin. Flatfish, rockfish and lingcod are also extremely important. The Bodega Bay Basin covers a much smaller area than the other basins yet 2-3 percent of the state's salmon are caught there.

In the Santa Cruz Basin the most important fisheries are for salmon, flatfish, rockfish and Dungeness crab. Over 10% of the state's red abalone are harvested from the Santa Maria Basin and very important fisheries also exist in this area for rockfish and flatfish. Annual variations in catch data can be quite large due to the status of the population and market demand.

The commercial fishing industry is a mainstay of the local economies of most of central and northern California communities. The value of this industry can be demonstrated by the port landings, although the true value of the industry is much greater than this due to the contributions of the support, processing, transportation and marketing industries. Landings of the more important commercial fishes and invertebrates at ports near the five lease areas have been compiled for 1976 (Table III.B.1-3), the most recent year that this data is available. This table also gives the total landings at each port.

Eureka is the most important port adjacent to the lease areas and it is very important on a statewide basis with \$12 million worth or 6.5% of the State's landings. Fort Bragg is the next most important port with nearly \$6 million worth of landings. Between \$2-4 million worth of fishes and invertebrates are landed at Bodega Bay, San Francisco, Moss Landing and Monterey.

Additionally, a large foreign fishery occurs off part of the California coast. In 1977, the Fishery Conservation and Management Act of 1976 (Public Law 94-265) was implemented giving the United States jurisdictional control and management responsibility for all fisheries except migratory tuna within a conterminous distance of 200 miles of the coast. The Pacific Fishery Management Council, in cooperation with the Department of Commerce, regulates the amount of harvest, harvest seasons and type of gear to be used by foreign and domestic fishermen in waters off California, Oregon and Washington.

Visual No. 3 shows the major fishing areas for the most important domestic fisheries. The following sections briefly describe these fisheries.

a. Flatfish: Flatfish are demersal, and collectively they are one of the most important groups of fresh and frozen market fish in California; they are taken in the trawl fishery. The major

TABLE III.B.1-2

POUNDS AND VALUE OF THE MORE IMPORTANT COMMERCIAL FISHES AND INVERTEBRATES
CAUGHT IN WATERS IN OR IMMEDIATELY ADJACENT TO THE FIVE LEASE AREAS FROM 1966-1975

<u>Species</u>	<u>Pounds</u>	<u>Value</u>	<u>Percent (%) of Total Pounds Caught in State^c</u>
EEL RIVER BASIN			
		<u>1975</u>	
Flatfish	3,907,419	\$586,113	11.3
Rockfish	714,318	78,575	3.0
Sablefish	583,653	56,245	4.1
Salmon	27,312	26,493	0.3
		<u>1974</u>	
Flatfish	3,574,399	\$536,160	11.9
Salmon	142,509	119,708	1.6
Rockfish	810,528	89,158	3.7
Sablefish	422,371	39,365	3.5
Lingcod	204,014	28,011	5.3
		<u>1973</u>	
Flatfish	3,618,297	\$434,196	11.1
Rockfish	657,761	52,621	2.9
Sablefish	506,838	38,973	5.9
		<u>1972</u>	
Flatfish	4,278,652	\$470,652	13.6
Rockfish	877,424	61,419	5.3
Sablefish	606,523	48,370	7.2
Lingcod	249,094	26,086	7.7
		<u>1971</u>	
Flatfish	2,593,990	\$285,339	10.7
Rockfish	558,773	33,526	5.0
		<u>1970</u>	
Flatfish	3,645,838	\$364,584	14.5
Rockfish	580,425	34,825	5.4
Sablefish	330,561	25,189	7.5
		<u>1969</u>	
Flatfish	4,248,873	\$382,399	18.1
Rockfish	543,703	32,622	5.1
Sablefish	318,487	26,116	7.7

TABLE III.B.1-2 (Cont.)

<u>Species</u>	<u>Pounds</u>	<u>Value</u>	<u>Percent (%) of Total Pounds Caught in State^c</u>
EEL RIVER BASIN (Continued)			
		<u>1968</u>	
Flatfish	3,338,934	\$300,504	15.3
Rockfish	405,510	20,275	4.2
		<u>1967</u>	
Flatfish	2,428,845	\$218,596	11.9
		<u>1966</u>	
Flatfish	2,985,728	\$268,716	13.4
POINT ARENA BASIN			
		<u>1975</u>	
Salmon	734,883	\$734,883	10.6
Flatfish	2,894,347	434,152	8.3
Rockfish	1,812,540	199,379	7.6
Sablefish	900,646	86,792	6.4
Lingcod	213,283	27,727	6.6
Albacore	77,242	23,945	0.5
Dungeness crab	34,230	23,276	0.8
		<u>1974</u>	
Salmon	1,264,358	\$1,125,279	14.4
Flatfish	2,632,490	394,873	8.7
Rockfish	1,513,553	166,491	7.0
Albacore	523,286	117,917	4.4
Sablefish	1,031,021	96,991	8.6
Lingcod	308,307	43,170	8.0
		<u>1973</u>	
Salmon	1,235,427	\$1,087,176	12.7
Flatfish	2,714,138	325,696	8.3
Sablefish	982,622	75,558	11.5
Rockfish	848,811	67,744	3.8
Albacore	148,700	57,993	1.7
		<u>1972</u>	
Salmon	1,029,146	\$720,402	16.0
Flatfish	2,165,544	238,210	6.9
Sablefish	987,702	78,769	11.8
Rockfish	736,315	51,542	4.4
Lingcod	273,955	27,395	8.4
Albacore	67,161	21,491	0.3

TABLE III.B.1-2 (Cont.)

<u>Species</u>	<u>Pounds</u>	<u>Value</u>	<u>Percent (%) of Total Pounds Caught in State^c</u>
POINT ARENA BASIN (Continued)			
		1971	
Flatfish	1,781,620	\$195,978	7.3
Sablefish	621,038	43,038	14.0
Rockfish	428,929	30,025	3.8
Salmon	29,702	16,039	0.3
Lingcod	63,764	6,376	3.0
Albacore	12,829	3,720	0.04
Dungeness crab	593	172	0.01
		1970	
Flatfish	1,469,350	\$146,935	5.8
Sablefish	357,200	27,219	8.1
Rockfish	371,039	22,262	3.5
Albacore	29,178	7,294	0.1
Lingcod	64,815	6,481	4.2
Salmon	383	504	0.01
		1969	
Flatfish	1,186,493	\$106,784	5.0
Sablefish	336,213	27,570	8.1
Rockfish	376,925	22,615	4.0
		1968	
Salmon	188,226	\$109,171	2.7
Flatfish	908,527	81,767	4.1
Rockfish	336,610	20,197	3.5
		1967	
Salmon	158,953	\$84,245	2.1
Flatfish	888,438	79,959	4.3
Albacore	128,194	24,357	0.7
		1966	
Salmon	440,794	\$211,581	4.6
Flatfish	965,578	86,902	4.3
BODEGA BAY BASIN			
		1975	
Salmon	163,924	\$173,759	2.3
Albacore	138,026	44,168	0.9
Flatfish	257,124	38,569	0.7

(Cont.) TABLE III.B.1-2 (Cont.)

<u>Species</u>	<u>Pounds</u>	<u>Value</u>	<u>Percent (%) of Total Pounds Caught in State^c</u>
BODEGA BAY BASIN (Continued)			
		<u>1974</u>	
Salmon	215,129	\$217,280	2.4
Flatfish	269,090	40,363	0.9
		<u>1973</u>	
Salmon	32,975	\$33,964	0.3
		<u>1972</u>	
Salmon	229,003	\$185,492	3.5
Albacore	329,213	105,348	1.5
		<u>1971</u>	
Flatfish	383,309	\$42,164	1.5
		<u>1970</u>	
Flatfish	330,512	33,051	1.3
		<u>1969</u>	
Flatfish	302,315	\$27,208	1.2
		<u>1968</u>	
Flatfish	227,068	\$20,436	1.0
		<u>1967</u>	
Flatfish	336,679	\$30,301	1.6
		<u>1966</u>	
Flatfish	272,372	\$24,513	1.2
SANTA CRUZ BASIN			
		<u>1975</u>	
Salmon	337,005	\$357,838	4.9
Flatfish	946,698	156,459	2.7
Rockfish	404,383	56,674	1.7
Dungeness crab	36,235	35,297	0.9
		<u>1974</u>	
Salmon	742,457	\$748,416	8.5
Flatfish	917,100	157,217	3.1
Dungeness crab	60,995	56,280	8.9
Albacore	156,452	54,523	1.3
Rockfish	249,617	31,851	1.2

TABLE III.B.1-2 (Cont.)

<u>Species</u>	<u>Pounds</u>	<u>Value</u>	<u>Percent (%) of Total Pounds Caught in State^c</u>
SANTA MARIA BASIN (Continued)			
		<u>1974</u>	
Rockfish	1,637,867	\$229,301	7.6
Red abalone	139,214	94,665	18.5
Flatfish	505,769	75,865	0.02
Albacore	149,311	53,752	1.2
Lingcod	252,223	32,789	6.6
Sea urchin	399,093	27,936	5.6
		<u>1973</u>	
Albacore	451,779	\$180,712	5.2
Rockfish	1,403,525	140,352	6.3
Salmon	94,183	105,485	0.07
Red abalone	110,028	63,816	16.5
Flatfish	423,688	50,842	1.3
Lingcod	351,917	35,192	9.8
Sea urchin	264,968	21,197	7.3
Dungeness crab	22,695	20,652	2.2
		<u>1972</u>	
Albacore	472,950	\$151,344	2.7
Red abalone	207,657	105,905	18.8
Rockfish	1,151,332	103,620	7.0
Flatfish	486,547	53,520	1.5
Lingcod	218,746	21,875	6.7
		<u>1971</u>	
Albacore	42,241	\$12,672	0.1
Lingcod	82,553	8,255	3.9
Salmon	1,504	1,113	0.02
Rock crab	147	13	0.03
Dungeness crab	4	2	0.00
		<u>1970</u>	
Albacore	676,679	\$175,936	2.2
Red abalone	225,318	76,608	7.7
Rockfish	1,023,224	71,626	9.5
Flatfish	436,620	43,662	1.7
		<u>1969</u>	
Albacore	744,130	\$156,267	5.0
Red abalone	420,578	134,585	11.5
Rockfish	829,860	49,792	8.9
Flatfish	256,230	23,061	1.0

TABLE III.B.1-2 (Cont.)

<u>Species</u>	<u>Pounds</u>	<u>Value</u>	<u>Percent (%) of Total Pounds Caught in State^c</u>
SANTA MARIA BASIN (Continued)			
		1968	
Red abalone	582,074	\$157,160	13.0
Albacore	793,870	150,835	5.2
Rockfish	730,488	43,829	7.7
		1967	
Flatfish	195,715	\$17,614	0.9
Lingcod	22,588	2,033	2.0
Salmon	1,655	1,076	0.04
Dungeness crab	159	65	0.00
Rock crab	680	41	0.1
		1966	
Red abalone	798,285	\$151,674	16.0
Albacore	285,030	51,305	1.5
Rockfish	443,070	26,584	4.4
Flatfish	219,745	19,777	0.9
Salmon	8,081	4,768	0.09
Lingcod	13,819	1,244	1.7
Dungeness crab	2,656	1,169	0.02

^aCompiled from catch by origin data obtained from the California Dept. of Fish and Game utilizing the following statistical catch block:

Eel River Basin: blocks 203, 204, 211, 212

Point Arena Basin: blocks 263, 264, 269, 270, 275, 276

Bodega Bay Basin: blocks 432, 433

Santa Cruz Basin: blocks 464, 465, 471, 473, 479, 480, 502, 503

Santa Maria Basin: blocks 608, 615, 616, 624, 625, 632, 633, 634, 638, 639, 644, 645

^bConverted to value utilizing data presented in the California Dept. of Fish and Game's annual California Marine Fish Landings for the following ports or areas:

Eel River Basin: Eureka (port)

Point Arena Basin: Fort Bragg (port)

Bodega Bay Basin: San Francisco area

Santa Cruz Basin: San Francisco area

Santa Maria Basin: Santa Barbara area

^cDetermined utilizing data presented in the California Dept. of Fish and Game's annual California Marine Fish Landings.

TABLE III.B.1-3

LANDINGS (1976) OF THE MORE IMPORTANT COMMERCIAL FISHES AND INVERTEBRATES
AT PORTS NEAR THE FIVE LEASE AREAS^a

Basin and Port	Pounds	Value	Percent (%) of State Total	
			Pounds	Value
EEL RIVER BASIN				
<u>Trinidad</u>				
Dungeness crab	744,237	\$480,502	4.7	4.7
Salmon	212,480	248,208	2.7	2.3
All other species	25,730	3,792	-	-
Port totals	982,447	\$732,502	0.1	0.4
<u>Eureka</u>				
Dungeness crab	6,653,037	\$4,295,403	42.3	41.8
Salmon	1,902,114	2,504,011	24.4	23.4
Dover sole	11,167,360	1,498,048	49.1	48.8
Albacore	2,312,144	1,054,919	12.9	8.3
Giant Pacific oyster	466,667	653,334	65.7	65.7
Rockfish	4,104,355	560,022	16.7	14.1
Pacific Ocean shrimp	1,659,781	323,473	47.4	47.4
Sable fish	2,443,309	239,998	18.3	19.1
Petrale sole	641,073	177,588	21.5	21.8
English sole	760,188	155,637	17.7	17.8
Rex sole	684,059	141,123	34.0	34.4
Lingcod	448,560	65,468	14.4	14.3
All other species	1,264,793	176,120	-	-
Port totals	34,507,440	\$11,845,144	3.8	6.5
POINT ARENA BASIN				
<u>Fort Bragg</u>				
Salmon	1,595,281	\$2,217,157	20.5	20.7
Albacore	2,021,281	922,213	11.3	7.2
Dungeness crab	1,081,933	698,529	6.9	6.8
Rockfish	4,546,405	643,019	18.5	16.2
Dover sole	3,818,367	512,216	16.8	16.7
Sable fish	2,221,629	218,224	16.7	17.3
Petrale sole	423,070	117,198	14.2	14.4
Pacific Ocean shrimp	535,038	104,273	15.4	15.3
Lingcod	685,736	100,084	22.0	21.8
Rex sole	445,725	91,954	22.1	22.4
English sole	328,733	67,303	7.7	7.7
All other species	238,567	44,513	-	-
Port totals	17,979,874	\$5,736,683	2.0	3.1

(3) TABLE III.B.1-3 (Cont.)

Basin and Port	Pounds	Value	Percent (%) of State Total	
			Pounds	Value
POINT ARENA BASIN (continued)				
<u>Albion</u>				
Salmon	218,702	\$304,908	2.8	2.8
All other species	60,382	13,397	-	-
Port totals	279,084	\$318,305	0.03	0.2
BODEGA BAY BASIN				
<u>Bodega Bay</u>				
Salmon	859,474	\$1,221,756	11.0	11.4
Albacore	522,905	239,922	2.9	1.9
Dungeness crab	233,458	190,404	1.5	1.9
Dover sole	1,184,637	164,709	5.2	5.4
Rockfish	680,962	107,870	2.8	2.7
Pacific herring	665,689	60,367	13.8	13.7
English sole	286,990	61,532	6.7	7.0
All other species	747,824	114,381	-	-
Port totals	5,176,939	\$2,166,941	0.6	1.2
<u>Point Reyes</u>				
Giant Pacific oyster	210,544	\$294,762	29.6	29.6
Salmon	93,533	135,914	1.2	1.3
All other species	25,224	19,953	-	-
Port totals	329,301	\$450,629	0.04	0.2
SANTA CRUZ BASIN				
<u>Sausalito</u>				
Albacore	1,289,966	\$591,870	1.8	0.5
Salmon	327,076	459,405	4.2	4.3
Pacific herring	1,000,994	99,796	20.8	20.7
All other species	571,583	63,596	-	-
Port totals	3,189,619	\$1,214,667	0.4	0.7
<u>San Francisco</u>				
Rockfish	1,645,525	\$280,909	6.7	7.1
Petrable sole	904,635	248,181	30.4	30.5
Pacific herring	2,477,209	246,971	51.4	51.2
Dover sole	1,530,706	212,826	6.7	6.9
English sole	970,761	208,134	22.7	23.8
Dungeness crab	205,369	167,495	1.3	1.6
Salmon	113,019	158,539	1.5	1.5
Sanddab	582,665	123,381	45.0	46.4
Lingcod	722,946	103,724	23.2	22.6
Albacore	202,454	92,891	1.1	0.7
Rex sole	252,671	53,991	12.6	13.1
All other species	1,083,830	151,656	-	-
Port totals	10,691,790	\$2,048,698	1.2	1.1

TABLE III.B.1-3 (Cont.)

Basin and Port	Pounds	Value	Percent (%) of State Total	
			Pounds	Value
SANTA CRUZ BASIN (continued)				
<u>Oakland</u>				
Albacore	982,309	\$450,709	1.4	0.4
Salmon	110,190	155,640	1.4	1.5
All other species	8,288	6,761	-	-
Port totals	1,100,787	\$613,110	0.1	0.3
<u>Princeton</u>				
Salmon	185,662	\$269,293	2.4	2.5
Albacore	274,077	125,754	1.5	1.0
Dungeness crab	150,438	122,695	1.0	1.2
Red abalone	62,953	70,590	8.5	10.0
All other species	379,326	75,830	-	-
Port totals	1,052,456	\$664,162	0.01	0.4
<u>Santa Cruz</u>				
Salmon	178,952	\$264,256	2.3	2.5
All other species	322,270	83,235	-	-
Port totals	501,222	\$347,491	0.06	0.2
<u>Moss Landing</u>				
Albacore	4,309,667	\$1,938,565	24.1	15.2
Salmon	550,244	815,684	7.1	7.6
Dover sole	1,539,010	211,232	6.8	6.9
Northern anchovy	9,715,912	194,594	3.9	4.2
Rockfish	1,301,362	189,314	5.3	4.8
Sablefish	784,857	71,839	5.9	5.7
All other species	811,216	109,006	-	-
Port totals	19,012,268	\$3,530,234	2.1	1.9
<u>Monterey</u>				
Sablefish	6,330,133	\$579,405	47.5	46.0
Rockfish	3,374,932	540,294	13.7	13.6
Albacore	1,157,694	520,751	6.5	4.1
Salmon	280,045	421,029	3.6	3.9
Market squid	4,646,357	319,844	22.9	42.8
English sole	339,842	59,898	7.9	6.9
Spot prawn	23,364	55,554	20.8	30.5
All other species	1,573,026	214,982	-	-
Port totals	17,725,393	\$2,711,757	2.0	1.5

TABLE III.B.1-3 (Cont.)

Basin and Port	Pounds	Value	Percent (%) of State Pounds	Total Value
SANTA MARIA BASIN				
<u>Morro Bay</u>				
Albacore	1,555,466	\$720,243	8.7	5.7
Rockfish	2,832,661	453,388	11.5	11.4
Salmon	105,927	187,455	1.4	1.8
Petrale sole	315,146	84,694	10.6	10.4
Lingcod	356,020	54,564	11.4	11.9
All other species	531,167	171,373	-	-
Port totals	5,696,387	\$1,671,717	0.6	0.9
<u>Avila</u>				
Rockfish	1,323,588	\$204,681	5.4	5.1
Salmon	96,875	166,546	1.2	1.6
Albacore	156,197	72,326	0.9	0.6
Rock crab	210,261	57,173	17.1	16.7
California halibut	59,151	53,374	9.4	10.0
All other species	696,470	187,199	-	-
Port totals	2,544,542	\$741,299	0.3	0.4

^aSource: Compiled from data presented in Oliphant (1979)

species are: Dover sole, Microstomus pacificus; English sole, Parophrys vetulus; petrale sole, Eopsetta jordani; rex sole, Glyptocephalus zachirus; starry flounder, Platichthys stellatus; Pacific sanddab, Citharichthys sordidus; arrowtooth flounder, Atheresthes stomias; and California halibut, Paralichthys californicus. All the flatfish range from southern California to Canada or Alaska, except California halibut which occurs from Baja California to Washington (See Table 1 on Visual No. 3). The spawning times and movements of adult flatfish are listed in Table III.B.1-4. The Eel River Basin tracts directly overlap spawning areas for Petrale and Dover sole.

Fishing for flatfish in California began in San Francisco Bay in 1867 and has gradually expanded. All major ports now have trawl fleets. About two-thirds of the 30 million pounds landed annually are Dover sole. New trawlers joining the fleet, especially at Crescent City, Eureka, and Fort Bragg, are expected to increase production. In most of the waters off California, trawling is prohibited within 3 miles of shore. Major trawl grounds are found along the entire coast outside this 3 mile limit (See Table 1 on Visual No. 3). Crescent City, Eureka, Fort Bragg, and San Francisco are the major landing ports.

The trawl fishery for flatfish occurs throughout the year. Although the Dover sole is the target species for most trawlers, the smaller boats fish for English, rex, and petrale, along the northern coast, and for halibut in the Morro Bay area. Boats 12-25 m (40 to 80 feet) in length are operated in the fishery. The trawl gear consists of a net bag towed with bridles attached to each side of the bag. The net bag is spread by otter boards or doors that are fixed to the bridles. Vertical spreading is accomplished in the front of the net by floats at the top and weights such as chain at the bottom of the net.

Flatfish are landed whole, held in ice, cut into fillets, quick-frozen and sold to local California markets. About 60 percent of the fish is waste. Much of this waste is thrown away or utilized for pet or mink food.

b. Rockfish: Rockfish are of major importance to sport and commercial fishermen. Eight species predominate in the commercial catch. Two or three rockfishes of different species often live in close association, and they are caught together. Most rockfish are found near reefs, kelp beds and other rocky areas from the intertidal zone to at least 550 m (see Table 2 on Visual No. 3).

Reproduction is ovoviviparous and the eggs hatch upon release into the water. The larvae are pelagic, and the main nursery area is from the tidepool level to 30 m (100 feet), including kelp beds. The spawning time of most commercial species is November to March. Rockfish larvae are common in plankton tows at depths less than 50 fathoms. The larvae are found associated with anchovy, mackerel and sardine larvae. Rockfish grow slowly and attain ages from 16 to 30 years. The movements of

TABLE III.B.1-4

SPAWNING TIMES AND MOVEMENTS OF ADULT FLATFISH^a

Species	Period of Spawning	Depth Range & Movement of Adults
Dover sole	Nov-Mar	20-800 fathoms Extensive inshore-offshore movement associated with spawning but very limited coastwise movement
English sole	Nov-Mar	Inside 200 fathoms Some fish with coastwise movements
Petrale sole	Nov-Mar	Spring-Summer inshore & north 20-150 fathoms Fall-Winter offshore & south 150-200 fathoms
Rex sole	Jan-June	20-250 fathoms Little known of movements
Starry flounder	Nov-Feb	Bays to 150 fathoms Move to estuaries to spawn, but no indication of coastwise movement
Calif. halibut	Feb-July	0-25 fathoms Some onshore-offshore movement

^aSources: Pacific Fishery Management Council (1979) and Frey (1971)

rockfish are not well known, but studies of a few species have been conducted (Winzler and Kelly Consulting Engineers, 1977).

Historically, the rockfish fishery was conducted on boats 25 to 35 feet long, using longline gear. Trawl gear became important as a method of capture in 1943 in Monterey and Eureka. Rockfish are taken with a mid-water trawl within the Eel River Basin tracts where there is a hard rock outcrop. Beginning in 1968, gill nets came into use in Monterey for taking rockfish. The rockfish catch reached 24 million pounds in 1976 and is still increasing. Rockfish, often making up a large part of the general category of market fish, are landed whole, filleted, and sold fresh in all local markets.

c. Sablefish: The sablefish, Anoplopoma fimbria, is the second most numerous demersal fish below a depth of 200 m (650 feet) (Alverson, et al. 1964). The sablefish ranges from the Asiatic coast of the Bering Sea to Baja California. Two sablefish populations exist off California, one from Washington to central California and the other from central California to southern California. The exchange between subpopulations may be low because sablefish have not been observed to move over long distances (Calif. Dept. of Fish and Game 1971).

Sablefish prefer soft, muddy bottoms but can be found in areas that have sandy and rocky bottoms. They spawn from December to February. Large spawning adults occur in waters 275 to 450 fathoms deep (Heyamoto and Alton 1965). The surface zone above the slope is important as a nursery area for young fish. Immature sablefish are found as shallow as 50 fathoms or less in summer, but they tend to move to deeper waters in fall. About half of the males begin spawning by 5 years of age and about half of the females begin spawning by 7 years of age (Deweese 1980).

Fishing occurs year-round for sablefish. Catches made by longlines and pots are primarily over irregular bottom where trawlers cannot drag. The trawl catch of sablefish is incidental with catches of English and Dover sole. Longline and pot fishing boats in the fishery range from 9-25 m (30 to 80 feet) in length. The fishing grounds are located on mud bottoms off all major fishing ports. Sablefish are usually landed whole and the fish are graded by size. Higher prices are paid for larger sablefish. The smoked fish market prefers fish over 5 pounds, while small ones are usually processed into fillets and sold in the market as butterfish. The sablefish landings in California have increased each year since 1965 from approximately 2.8 million pounds to 13.0 million pounds in 1976.

d. The Northern Anchovy: The anchovy, Engraulis mordax, a pelagic schooling fish, is the most numerous fish in the California current. The collapse of the sardine fishery and the great decrease in sardine numbers in the 1940's has been followed by a large increase in numbers of anchovies. A law prohibiting reduction plants in California

curtailed development of the anchovy fishery until 1965 when an anchovy reduction quota was established. Presently, most of the effort in the fishery is in the Monterey Bay area and south of Point Conception. Catches are increasing in both areas.

The season for fishing is year-around. Off Monterey, the main fishery occurs in the spring and summer when the anchovies are close to shore. Less is known of the seasonal availability of anchovies to fishermen north of San Francisco. Two types of fisheries occur, one for reduction, and one for bait. Anchovies for the reduction fishery are caught with purse seines from boats in the 80-foot class with the capability of 200-ton catches a night. The bait fishery uses smaller boats in the 50-foot range and the lampara is the primary net used.

Fish for reduction are processed into fish meals and oil. Bait is packaged and frozen for state-wide distribution to sport and commercial fishermen. Some live bait is held for sale in net pens. North of Point Conception, since 1965, catch has fluctuated around approximately 4,000 tons with three-fourths going for reduction at Monterey and one-fourth going for bait in Morro, Monterey, and San Francisco Bays.

Most of the fishery occurs within 40 km (25 miles) of Moss Landing where the reduction plant is located. Anchovies for bait are taken in or near Monterey, Morro, and San Francisco Bays in summer and fall. Only three or four boats work out of each port. The fishing areas will expand up and down the coast as the catch for reduction increases.

e. Salmon: Two species of Pacific salmon, king salmon Oncorhynchus tshawytscha and silver salmon O. kisutch, are taken in large quantities in the commercial fishery of California. However, pink salmon O. gorbuscha have been taken in numbers up to 30,000 annually. Salmon are anadromous and require freshwater to reproduce. Major spawning streams near the proposed Eel River tracts are Mad River and Eel River. Near the Point Arena tracts, there are several major spawning streams: Ten Mile River, Noyo River, Big River, Navarro River, Garcia River and Gualala River. An important salmon spawning stream near the Bodega Bay tracts is the Russian River, and near the Santa Cruz tracts is the San Lorenzo River. Young salmon migrate to the sea to grow and mature before again returning to their river of origin. The salmon fishery is one of the oldest on the coast. Industrial, agricultural, and domestic uses of freshwater have severely reduced wild runs of salmon. Hatchery-reared salmon, released at the time and size of their natural migration to the sea, now contribute significantly to the commercial ocean catch. The number of salmon fishermen is increasing each year in California and they compete for salmon stocks that are still under great pressure from freshwater developments and habitat degradation.

The only legal method for commercial capture of salmon in California is by trolling. In California, there were 2,500 licensed trollers

(vessels) during 1975 (Chaney and Perry 1976) and 5,500 in 1979 (Don Bradley, Salmon Trollers Marketing Association, pers. comm.). The troll fleets of California and Oregon intermix during the commercial season.

California's catch mainly is taken from Monterey north to Crescent City. A few salmon are landed south of Monterey, but generally amount to less than 1 percent of the State's total. King salmon almost totally dominate the commercial salmon catch landed at ports around Monterey and San Francisco. Northern California ports now land catches of silver salmon which rival in size those of king salmon. The best ocean salmon fishing in California is a few miles offshore.

In weight, California king salmon landings have historically ranged from peak catches of over 13 million pounds in 1918, 1919, 1945, and 1946 to a low of only 3.7 million pounds in 1958 (Frey 1971). Prolonged low rainfalls in the 1930's, along with the construction of dams, water diversions, and habitat degradation, had a detrimental effect on the industry's landings from 1928 to 1941. From 1963 to 1967, the commercial salmon industry rebounded with catches between 7.4 and 9.7 million pounds (Frey 1971). Present catches of king salmon, since 1970, have averaged around 6.5 million pounds (Verhoeven 1972-1976).

Salmon (king and silver) fishing pressure remained at about the same level between 1965 and 1972, but it increased in 1973 and in 1974, especially in the North Coast area, from Fort Bragg to Crescent City. The majority of the catch of king salmon (2.5 million pounds) was taken in the San Francisco area in 1974. In 1975, poor landings occurred in San Francisco and Monterey; but the North Coast area produced one of the best catches (3.8 million pounds) in recent years (Verhoeven 1976).

As greater demands are put on California's salmon resources, their value will continue to increase. In recent 11 years, salmon have been the most valuable fishes per pound in the California commercial fishery. They represent 10 percent of the total value of the commercial catch, which approached \$5 million in 1965 (Holmberg 1972). In the Eureka area, salmon landings supplied 29 percent of the commercial fishermen's income from 1947 to 1960.

f. Albacore Tuna: The albacore tuna, Thunnus alalunga, is a pelagic schooling fish inhabiting the Pacific Coast of North America as far north as Vancouver Island during the summer and fall. As albacore move toward the eastern Pacific, they enter the American commercial fishery. Albacore fishermen often fish for salmon until albacore reach the coast. Recent court rulings to stop or curtail fishing for yellowfin tuna will likely put pressure on the albacore fishery to increase the catch.

The majority of the fish off the California coast are 2 or 3 years old. These fish first enter the commercial fishery northwest of Midway Island where a Japanese live bait fishery exists in winter. As the fish move

westward, they enter the American jig fishery 965 km (600 miles) west of Point Conception in May.

Fishing generally occurs from May through November. Tuna are taken by trolling 8 to 10 lines at the surface. Boats range from 6 m (20 feet) to about 25 m (80 feet) in length. The largest component of albacore boats is located at Moss Landing. Tuna are also taken with live bait by boats 15 m to 30 m (50 to 100 feet) in length. These boats are much less numerous in the fleet.

Albacore are frozen at sea and remain frozen until processed at canneries located in Oregon or southern California. Fish are trucked to these areas from local buying stations along the coast. Since Oregon, Washington, and California boats all fish the same stock, the catch for the total area is considerable. It amounted to an annual average of 45.6 million pounds (1950-1974). The catch is landed at local ports all along the coast. Landings vary greatly and they depend on where fish are being taken and proximity to the cannery. Fishermen prefer to land catches in Astoria, Oregon, Terminal Island, and San Diego because of better prices received when landing directly at canneries. It is likely that in the long term, catches will only modestly increase. These increases may come from development of new fishing areas located several hundred miles offshore. In northern California, major fishing grounds are located seaward of Cape Mendocino and Monterey in the vicinity of the Pioneer and Davidson Sea Mount.

g. Pacific Herring: The Pacific herring, Clupea harengus, is a pelagic schooling fish that ranges in the eastern Pacific Ocean from San Diego to the Bering Sea. The major herring fisheries in California have historically centered in the San Francisco-Tomales Bay area. The subpopulation of herring off California has never been over-exploited as have other northern herring stocks. The herring fishery began in 1968.

Within its wide range, herring form a series of local integrating populations with some interchange between populations. The major herring population in California waters are from stocks that spawn in San Francisco Bay and Tomales Bay. Humboldt Bay and Monterey Bay have small spawning runs. Nearly all estuaries have small runs of herring. San Francisco Bay fishermen indicate that some spawning also occurs along the open coast.

During fall, winter, and spring, herring enter estuaries to spawn. Eggs are deposited on seaweed, pilings, and anything projecting above the bottom. Eggs hatch in 6 to 10 days and the small fish remain in the bay for a time before moving to the open sea. Young fish spawned from early fall to winter tend to stay in the bays longer than fish spawned later in the year. Young herring do not enter the commercial catch for several months after hatching. The age groups in the fishery are from 1 to 9 years. The bulk of the fish in the spawning runs are 1 to 6 years

old.

Four types of gear are used in the herring fishery. Purse seines are most important and they take most of the catch. The boats used are in the 18-25 m (60 to 80-foot) long range. Lampara nets are worked from boats about 15 m (50 feet) in length. Gill nets are gaining in use because they take herring with the highest egg yields. Beach seines are of minor importance in taking herring.

The major fishing areas are Tomales and San Francisco Bays. Minor fisheries occur in Monterey Bay and Humboldt Bay. Beginning in 1976, fishing began outside, but within a few miles of these bays. Large, gravid fish are preferred by fishermen because they are paid on an egg-yield of female herring. Fishermen indicate gill nets tend to take consistently high egg-yielding fish, and such fish are most abundant in bays as they come to spawn.

The total annual catch was about 3 million pounds or less from 1952 to 1973. Beginning in 1973, a quota of 4.5 million pounds of herring was set for Tomales Bay and San Francisco Bay combined. In 1974, the quota was increased and, because of a technicality concerning the take of herring for bait, the quota was greatly exceeded. The 1976 quota was 10.2 million pounds for Tomales and San Francisco Bays combined. Catch quotas are based on herring egg counts, and the quotas are adjusted to allow for adequate egg sets each year.

Herring are bought in San Francisco and Tomales Bays, salted and stored in bins until eggs can be extracted from females. Some herring are shipped out of the State for egg extraction. Eggs are shipped to Japan for human consumption. Little is done with herring carcasses after eggs are taken. There is a move to use herring waste for animal feed and for reduction.

h. Lingcod: The lingcod, Ophiodon elongatus, ranges from Baja California to northeastern Alaska. It is sought by both sport and commercial fishermen.

Most lingcod are taken incidentally in the trawl fishery out of San Francisco and Eureka. Salmon trollers or boats of similar size catch lingcod in the fall and winter with gill nets, longlines, and hook and line. Lingcod are landed whole, filleted and sold in local fresh fish markets and restaurants. Commercial landings during 1976 were 3.1 million pounds.

The California Department of Fish and Game (1971) suggests that the lingcod resource may be over-utilized in Morro Bay and other areas.

i. Underdeveloped Domestic Fisheries: Fish of current minor importance, but with potentially greater value are listed in Table III.B.1-5 with their ranges and habitats.

TABLE III.B.1-5

UNDERDEVELOPED DOMESTIC FISHERIES

Species ^a	California Distribution ^a	Habitat ^a	1976 California Landings (Pounds) ^b
White croaker, <u>Genyonemus lineatus</u>	San Francisco to the south	Sandy bottom, along shore and in estuaries	497,961
Surfperch, family Embiotocidae	Entire coast	Estuaries and nearshore area	142,037
Pacific saury <u>Sololabis saira</u>	Entire coast, 40 to 120 miles offshore	Pelagic	nil
Smelt of the families Osmerida and Atherinidae	Entire coast	Estuaries and nearshore	638,672
Pacific hake, <u>Merluccius productus</u>	Entire coast	Semipelagic, surface to bottom, to 300-400 fathoms	28,521

^aSource: Winzler and Kelly Consulting Engineers (1977)

^bSource: Oliphant (1979)

j. Invertebrate Fisheries: In addition to the fin fish fisheries described above, California supports several important invertebrate fisheries.

The Dungeness crab, Cancer magister, has a reported range from Magdalena Bay, Baja California, to Unalaska, Alaska, but it is considered rare south of Point Conception in California. It has a definite preference for sandy bottoms. Occasionally it will be found in mud, and only rarely in rocky areas. Although it may be found in depths of at least 225 m (750 feet), it is not abundant over 90 m (300 feet), and the greatest concentrations occur at depths between 2 to 35 m (6 to 120 feet). The life history involves a larval stage which may last 3 to 5 months. During this interval, the larvae are part of the zooplankton found in the upper 65 feet of the ocean. Initially, post-larval stages take up a benthic position in coastal shallows. Thus, bays and estuaries act as significant nursery grounds for the first two years of life. The Dungeness crab population shows both cyclic abundance and localized depletion of stocks. The crabs are taken commercially by circular steel traps.

There are three species of Cancer crabs collectively referred to as rock crabs. These are the yellow crab, C. anthonyi, the rock crab, C. antennarius, and the red crab, C. productus. All three are inshore species and are found on a variety of substrates, particularly in rocky areas. Rock crabs support a sizable sport fishery along the entire coast, but commercially they are taken only in the lower half of California.

The opalescent or market squid, Loligo opalescens, ranges from British Columbia to central Baja California and may occur in the Gulf of California. The squid fishery is based on schools that are moving inshore to spawn. The bulk of the catch is taken at Monterey by lampara boats. Mass spawning appears to begin about April in this region, and eggs hatch in 3 to 4 weeks. Almost all females spawn at the age of 3 years, but many males spawn earlier. All squid die after one spawning season.

The Pacific ocean shrimp, Pandalus jordani, are found from Unalaska in the Aleutian Islands to off San Diego, California, at depths from 45 to 360 m (150 to 1,200 feet). Spawning probably occurs throughout their range in California, and few survive beyond their fourth year. Shrimp are harvested using specially designed trawls.

The distribution of the spot prawn, Pandalus platyceros, is from Unalaska to off San Diego, California, in waters 45 to 475 m (150 to 1,600 feet) deep. The canyons off Monterey are the primary commercial fishing area in northern and central California but the Santa Maria Basin tracts directly overlap an important fishing ground off Morro Bay and Avila. Spawning takes place in the same areas, from 150 to 200 m (500 to 700 feet) in depth, where the prawns are fished. Spot prawns

are fished with traps.

Eight species of abalone occur in California, but only red abalone, Haliotis rufescens, is fished extensively in central and northern California. Red abalone range from Sunset Bay, Oregon, to Turtle Bay, Baja California. They are fished by divers in depths of 7 to 50 m (25 to 180 feet).

California's oyster industry is not based on the exploitation of a native marine resource, but depends on the culture of two important species: the eastern or American oyster, Crassostrea virginica, and the Pacific or Japanese oyster, C. gigas. The native "Olympia" oyster, Ostrea lurida, is not abundant and is not sought for commercial or sport use. Pacific oysters are grown in Humboldt Bay, Tomales Bay, Drakes Estero, Morro Bay and Encina Lagoon and landed in large numbers in central and northern California.

k. Mariculture: In addition to the culture of salmon and oysters discussed above, important mariculture operations include raising red abalone and clams. Red abalone are grown near Cayucos (San Luis Obispo County) and Monterey (Monterey County). Clams for seeding are raised near Moss Landing (Monterey County) and Pigeon Point (San Mateo County).

2. Recreation and Sportfishing

a. Recreation: The northern and central California coast is a highly sensitive natural resource area and is an important recreational asset to the residents of the State and to tourists. It is an extremely diverse area in respect to the landscape, in that it varies from rugged, wind blown cliffs to flat sandy beaches with stable dune backshores. This diversity creates a unique area which changes character at every bend of the shoreline and embayment, attracting tourists from all parts of the world to view the scenery and enjoy the solitude of vacationing in a pristine environment. Along the coast, recreation is primarily water-oriented, both from an active participation, and from an aesthetic and passive aspect. There are numerous public and privately owned recreational sites which have direct access to the ocean. These areas have a total shoreline of over 385.6 km (239.6 miles) which is more than 30.74 percent of the 1,254.3 km (779.4 miles) ocean shoreline of the North and Central Coast. This, in turn, permits visitors' access to the ocean with relative ease in order to pursue whatever activity they desire.

The major recreational activities of the area are sightseeing, beachcombing, picnicking, boating, swimming, wading, sunbathing, diving, surfing, and sportfishing. Sightseeing and beachcombing are enjoyed along the entire coast and are mainly dependent on the esthetic aspect of the area (see visual resources, Visual No. 6). Picnicking is mainly family group oriented and tends to be concentrated at easily accessible recreational facilities. Boating is not limited to any specific area along the coast, although concentrations can be found in areas such as Morro Bay, San Francisco Bay, Monterey Bay, and Tomales Bay. The major areas of boating can be seen in Visual No. 9. Boat registration and participation days can be found in Table III.B.2.a-1 which reflects the relative distribution of boating along the coast.

Swimming, wading, and sunbathing are primarily summer activities and will occur mainly on sandy coast type beaches (see Table III.B.2.a-2 for distribution). Diving occurs along the entire coast (Visual No. 9) and is growing more popular each year. This is evidenced by the fact that on an annual basis new and advanced certification of SCUBA divers has grown from approximately 116,000 in 1970 to over 280,000 in 1977. There are presently 8 underwater parks and 16 other subtidal areas proposed or under consideration by the State for inclusion in the California State Park system (see Figure III.B.2.a-1). These draw heavy use from the diving community.

Surfing depends entirely on the climatic and oceanic conditions that are present at each of the suitable surfbreaks. There has been a large increase in surfing over the past few years due to the use of wet suits to protect the surfers from the cold water that is found in this region. This has allowed surfing to spread along the entire coast of central and northern California, which when joined with the other recreational

TABLE III.B.2.a-1

RECREATIONAL BOATING BY COUNTY

County	1973 Boat Regis- tration	1976 Boat Regis- tration	1979 Boat Regis- tration	1977 Existing Berths	1977 Proposed Berths	1977 Existing Ramps	1977 Proposed Ramps	Average No. Day Boat Use	1979 Total Day Boat Use	1979 Partici- pation Days. 4.21 People/Boat
Del Norte	1,136	1,292	1,087	480	0	2	2	24.2	26,305	110,746
Humboldt	4,840	5,346	5,037	480	300	10	1	24.2	121,895	513,180
Mendocino	2,450	2,676	2,686	500	0	6	0	24.2	65,001	273,655
Sonoma	7,619	8,722	9,129	320	900	8	2	24.2	220,922	930,081
Marin	7,128	7,724	7,858	2,900	550	23	2	24.2	190,164	800,589
S.F. Bay	85,381	96,677	97,532	7,734	4,270	40	6	27.3	2,662,624	11,209,645
San Francisco	6,478	6,100	5,690	980	400	5	0	30.9	175,821	740,206
San Mateo	13,070	14,547	14,361	1,526	1,680	11	2	30.9	443,755	1,868,208
Santa Cruz	3,552	4,348	4,698	900	0	2	0	30.9	145,168	611,158
Monterey	4,804	5,755	5,643	850	0	7	0	30.9	174,369	734,092
San Luis Obispo	4,006	5,134	5,458	570	800	4	2	30.9	168,652	710,026
Santa Barbara	5,953	7,161	7,312	1,100	0	3	0	28.4	207,661	874,252
Total	146,417	165,482	166,491	18,340	8,900	121	17	27.6	4,602,337	19,375,838

Source: California Dept. of Navigation and Development, Oct. 1973.

Winzler and Kelly, August 1977.

California Dept. of Motor Vehicles 1980 (Personal Communication).

TABLE III.B.2.a-2
COAST TYPE BY OWNERSHIP
(IN KILOMETERS)

Sandy Coast						Rocky Coast							
County	Federal	State	County	Municipal	Private	Total	Federal	State	County	Municipal	Private	Total	Total Shoreline
Del Norte	6.9	1.8	2.4	0	29.9	41.0	15.0	11.9	0	0	5.3	32.2	73.2
Humboldt	15.6	33.5	4.5	2.4	101.9	157.9	3.2	7.9	0	0	26.2	37.3	195.2
Mendocino	0	11.1	0	0	47.1	58.2	2.7	6.4	0	0	126.2	135.3	193.5
Sonoma	0	9.7	3.7	0	9.7	23.1	0	16.7	2.9	0	57.1	76.7	99.8
Marin	24.8	1.6	0.2	0	31.4	58.0	21.6	8.5	0	0	24.9	55.0	113.0
San Francisco	1.6	0.3	0	6.8	0.8	9.5	0.6	0.8	0	1.6	0.3	3.3	12.8
San Mateo	0	15.3	1.3	1.0	31.5	49.1	1.4	9.0	1.0	0	29.5	40.9	90.0
Santa Cruz	0	103.8	0.3	0.8	19.3	124.2	0.6	6.6	0	0.3	25.4	32.9	157.1
Monterey	17.4	10.1	0.2	1.4	9.7	38.8	25.6	17.9	0	5.0	91.9	140.4	179.2
San Luis Obispo	0.2	21.9	4.2	0	37.2	63.5	0.8	5.6	0.6	0	79.3	86.3	149.8
Santa Barbara	22.3	12.6	7.7	6.6	85.1	134.3	15.6	3.9	0.5	0	20.9	40.9	175.2
Total	88.8	221.7	24.5	19.0	403.6	757.6	87.1	95.2	5.0	6.9	487.0	681.2	1438.8

Source: California Coastline Preservation and Recreation Plan, August, 1971.

1 Kilometer = 0.621 Miles

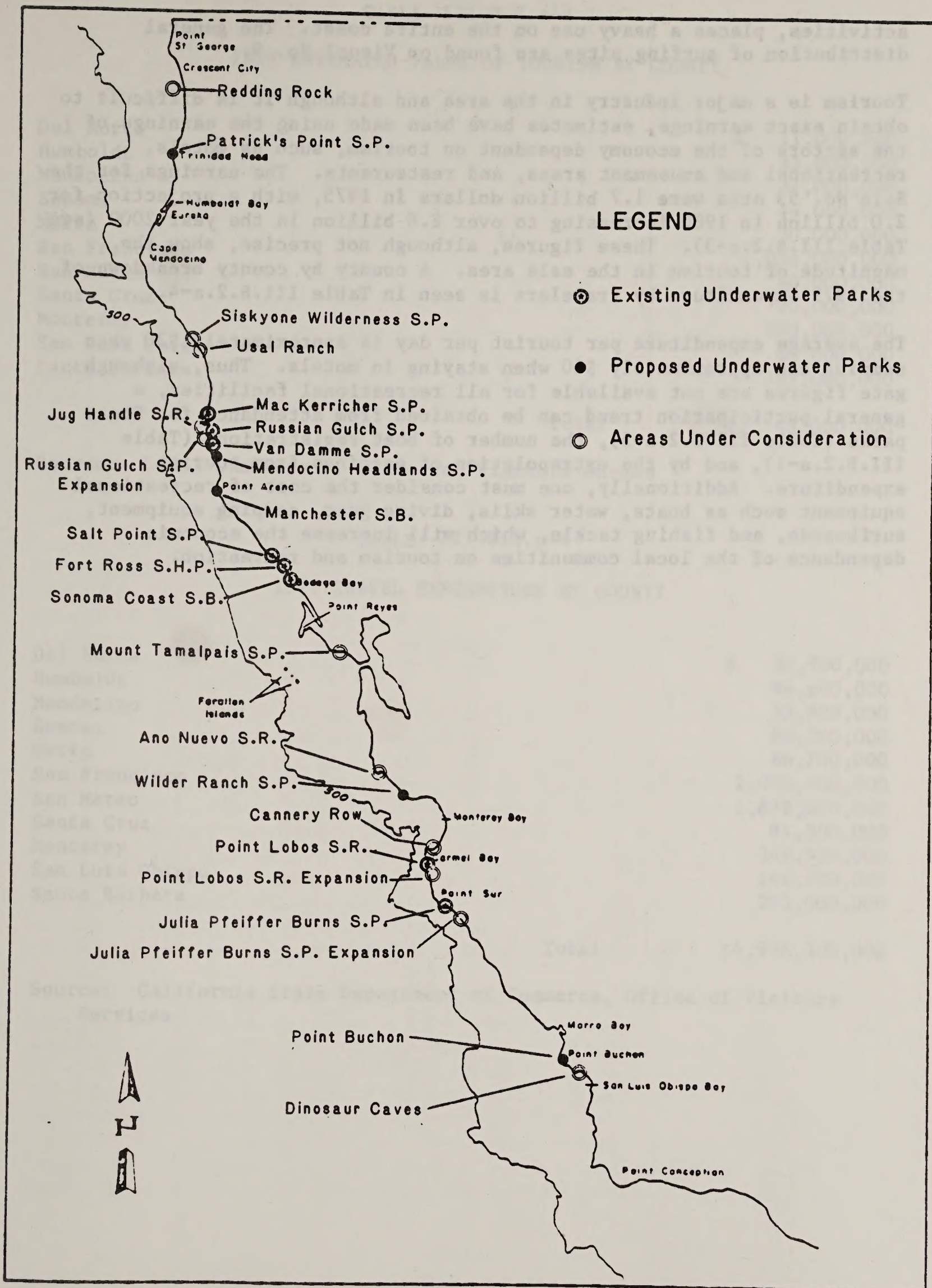


Figure III.B.2.a-1 Northern and Central California Underwater State Parks

activities, places a heavy use on the entire coast. The general distribution of surfing sites are found on Visual No. 9.

Tourism is a major industry in the area and although it is difficult to obtain exact earnings, estimates have been made using the earnings of the sectors of the economy dependent on tourism, such as motels, recreational and amusement areas, and restaurants. The earnings for the Sale No. 53 area were 1.7 billion dollars in 1975, with a projection for 2.0 billion in 1980 increasing to over 2.8 billion in the year 2000 (see Table III.B.2.a-3). These figures, although not precise, show the magnitude of tourism in the sale area. A county by county breakdown of the 1979 expenditure by travelers is seen in Table III.B.2.a-4.

The average expenditure per tourist per day is approximately \$30 when camping and approximately \$60 when staying in motels. Thus, although gate figures are not available for all recreational facilities, a general participation trend can be obtained from attendance for State parks (Table III.B.2.a-5), the number of boat registrations (Table III.B.2.a-1), and by the extrapolation of earnings from tourist expenditure. Additionally, one must consider the cost of recreational equipment such as boats, water skis, diving gear, camping equipment, surfboards, and fishing tackle, which will increase the economic dependence of the local communities on tourism and recreation.

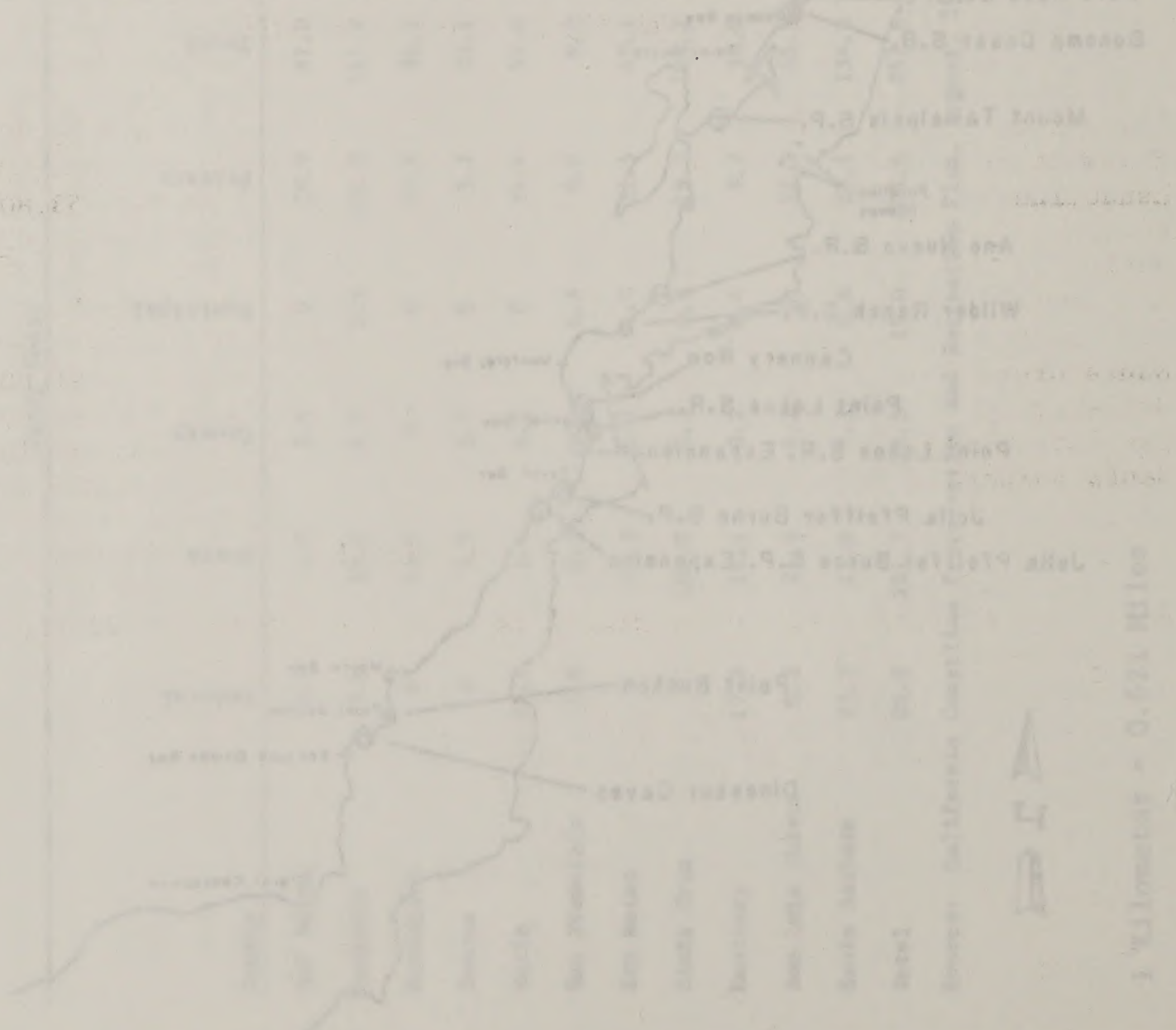


TABLE III.B.2.a-3

1979 ESTIMATED VALUE OF TOURISM BY COUNTY

Del Norte	\$ 11,000,000
Humboldt	35,000,000
Mendocino	37,000,000
Sonoma	44,000,000
Marin	30,000,000
San Francisco	1,054,000,000
San Mateo	60,000,000
Santa Cruz	90,000,000
Monterey	200,000,000
San Luis Obispo	80,000,000
Santa Barbara	107,000,000
Total	\$1,743,000,000

Source: Local Chambers of Commerce, Visitors Bureau

TABLE III.B.2.a-4

1979 TRAVEL EXPENDITURE BY COUNTY

Del Norte	\$ 20,900,000
Humboldt	64,600,000
Mendocino	53,800,000
Sonoma	98,000,000
Marin	66,700,000
San Francisco	2,034,000,000
San Mateo	1,879,000,000
Santa Cruz	81,800,000
Monterey	349,900,000
San Luis Obispo	146,700,000
Santa Barbara	203,000,000
Total	\$4,998,300,000

Source: California State Department of Commerce, Office of Visitors Services

TABLE III.B.2.a-5

COASTAL PARK ATTENDANCE BY COUNTY (To Nearest Thousand)

County	No. State Parks w/oceanfront	FY 79-80 Attendance	No. State Parks	FY 79-80 Attendance	County 1979 Attendance	No. Fed. Parks	1979 Attendance	Total Attendance
Del Norte	2	78,000+	3	253,000+	50,000	1	480,000	783,000+
Humboldt	5	500,000+	7	569,000+	150,000	1	56,000(1973)	775,000+
Mendocino	9	1,575,000	9	1,575,000	500,000		----	2,075,000
Sonoma	3	1,685,000	4	1,685,000+	334,000		----	2,019,000+
Marin	2	592,000	2	592,000	616,000	1	1,515,000	2,723,000
Golden Gate National Recreation Area		----		----	----	1	13,427,000	13,427,000
San Mateo	9	2,548,000	10	2,589,000	----		----	2,589,000
Santa Cruz	7	3,308,000	7	3,308,000	4,250,000		----	7,558,000
Monterey	10	1,854,000+	12	2,238,000+	1,300,000	1	5,000,000	8,538,000+
San Luis Obispo	8	3,696,000	9	4,584,000	3,182,000		----	7,766,000
Santa Barbara	0	----		----	125,000		----	125,000
Total	55	15,836,000+	63	17,393,000+	10,507,000		20,478,000	48,378,000+

Source: California Dept. of Parks and Recreation, Statistical Reports; Winzler and Kelly, August 1977; California Dept. of Parks and Recreation (Personal Communication 1980).

b. Sportfishing: Sportfishing is an important recreational activity throughout central and northern California. Many tourists are attracted to the area by the rich supply of marine resources. Six fishing methods predominate in the central and northern California ocean sportfishery: shore, pier, skiff, party boat, skin diving (including SCUBA), and surf netting. Shore and pier fishing are by far the most popular methods, receiving over 80 percent of the hook-and-line effort (Miller and Geibel 1973). Skiff, party boat (Young 1969), skin diving, and surf netters follow. Although more effort may be expended in shore and pier fishing, more fish per hour may be caught from boats.

A survey of all sportfishing methods from Point Arguello to Oregon was conducted as part of the Central California Marine Sportfish Survey by the Department of Fish and Game from 1957-1961. The purpose of this study was to determine the nature and extent of sportfisheries. This study (Miller and Gotshall 1965) remains the most extensive general sportfishery survey of the area.

The survey showed an average annual oceanfishing effort of around 1.5 million angler days being expended by sportfishermen. The average fishing day in hours, fish-per-day, and fish-per-hour are shown on Figure 1 on Visual No. 4. Since this survey revealed that the San Francisco to Yankee Point area received 54 percent of all sportfishing effort along the coast from Oregon to Point Arguello, a reassessment survey of the area was conducted in 1966 (Miller and Odemar 1968). The results of the 1966 survey and comparison with 1958-1960 results are shown in Table III.B.2.b-1.

The comparison indicates an overall decline in the amount of effort expended compared to the earlier period. Due to the overall importance of the San Francisco to Yankee Point area, this could be an indication of a general change throughout the central and northern California area. More recently, since 1970, there has been a general increase in the amount of effort expended by sportfishermen to the point that presently the annual average effort from Oregon to Point Arguello may be as much as 4 million angler days. Currently, the National Marine Fisheries Service and the California Department of Fish and Game are conducting a survey of marine recreational fisheries. The results of the first year of the study should be available in October 1980 (Deuel, in prep.).

Over 135 species representing 41 families have been recorded in the central and northern California sport catch. However, only about 20 are caught in large numbers. The species of most importance in the fishery as a whole include: blue rockfish, lingcod, striped bass, king salmon, silver salmon, white croaker, jacksmelt, barred surfperch, redbtail surfperch, yellowtail rockfish, black rockfish, shiner perch, vermilion rockfish and walleye surfperch. The annual average for 1958-1961 from Oregon to Point Arguello catch in both numbers and weight are shown in Table III.B.2.b-2. The numbers of the more important fish caught on

TABLE III.B.2.b-1

TOTAL OCEAN ANGLER DAYS EXPENDED IN 1966 WITHIN EACH COUNTY FROM
THE GOLDEN GATE TO POINT LOBOS, WITH A COMPARISON OF TOTAL ANGLER
DAYS EXPENDED IN 1958-1960

County (1966)	Fishery					Percent of Total Effort
	Pier	Shore	Partyboat	Skiff	Total	
San Francisco	--	29,428	--	--	29,428	4.8
San Mateo	34,312	124,960	10,490	11,050	180,812	29.3
Santa Cruz	173,177	46,878	11,937	29,928	261,920	42.4
Monterey	39,270	71,104	15,633	19,252	145,259	23.5
Totals	246,759	272,370	38,060	60,230	617,419	100.0
Percent of Total Effort	40.0	44.1	6.2	9.8	100.1	
1958-1960 Angler Days	230,940	385,402	38,888	37,965	674,631	
Decline (-) or Increase (+) of Effort	+6.9	-29.3	-2.1	+58.7	-8.5	

Source: Miller and Odemar 1968.

TABLE III.B.2.b-2

THE 15 MOST IMPORTANT SPECIES BY NUMBER RECORDED IN THE AVERAGE
ANNUAL CENTRAL AND NORTHERN CALIFORNIA SPORT CATCH FROM OREGON
TO POINT ARGUELLO, 1958-1961

Species	Total	Percent Comp. by Numbers	Average Weight in Lbs.	Total Catch in Pounds	Percent Comp. by Weight
Surfperch	1,253,753	36.96	0.73	924,405	21.15
Rockfish	919,289	23.57	1.83	1,635,630	33.57
White croaker	288,810	8.98	0.51	147,299	3.37
Jacksmelt	272,000	8.45	0.40	108,800	2.49
Striped bass	74,733	2.32	5.20	388,610	8.80
Flatfish	71,838	2.23	0.77	55,250	1.27
Kelp greenling	55,653	1.76	0.84	47,610	1.09
Cottids	55,393	1.72	1.46	81,010	1.85
Lingcod	51,253	1.59	8.00	410,030	9.38
King salmon	44,520	1.38	3.00	356,100	8.15
Topsmelt	42,664	1.33	0.25	10,670	0.24
Rock greenling	16,474	0.51	0.80	13,150	0.30
Jack mackerel	13,779	0.43	0.60	8,270	0.19
Pacific mackerel	9,222	0.29	0.57	5,260	0.12
Sharks, Skates, Rays	7,654	0.24	5.34	40,820	0.03
Total Caught	3,218,146	100.01	1.38	4,369,934	99.89
total Angler Days Expended	1,410,238				

Source: Miller and Gotshall 1965.

commercial passenger carrying fishing vessels (partyboats) for the five most recent years it is available in each of the lease areas. They are listed in Table III.B.2.b-3.

Habitat type and fishing method can affect the species composition of the catch. Some of the more frequently caught fish in rocky bottom, sandy bottom, and pelagic habitats are shown in Figures III.B.2.b-1 and III.B.2.b-2.

Additionally, several invertebrates are taken by sportsfishermen in central and northern California. Clam digging occurs along many beaches with some popular areas shown on Visual No. 4. Abalone are often taken by skin divers.

Rockfish	1,233,733	0.73	1.233,733	0.73	1,233,733	0.73
White croaker	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
Jack mackerel	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
Striped bass	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
Yellowtail	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
Kelp greenling	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
Cottidae	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
Lingcod	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
King salmon	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
Topomelic	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
Rock greenling	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
Jack mackerel	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
Pacific mackerel	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
Sharks, Skates, Rays	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
Total Catches	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73
Total Angler Days Expended	1,233,733	0.73	1,233,733	0.73	1,233,733	0.73

Source: Miller and Gossnell 1963.

TABLE III.B.2.b-3

THE NUMBERS OF THE MORE IMPORTANT FISH CAUGHT ON COMMERCIAL PASSENGER CARRYING FISHING VESSELS IN EACH OF THE LEASE AREAS^a

EEL RIVER BASIN

1974		1975		1976		1977		1978	
<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>
None		None		None		None		None	

POINT ARENA BASIN

1974		1975		1976		1977		1978	
<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>
Salmon	2,837	Rockfish	1,433	Rockfish	3,417	Rockfish	1,161	Rockfish	3,922
Rockfish	2,689	Salmon	636	Salmon	1,729	Salmon	108	Salmon	433
Lingcod	349	Lingcod	125	Lingcod	141			Lingcod	213
Flounder	125	Flounder	107						
Sanddab	55	Sanddab	62						

BODEGA BAY BASIN

1974		1975		1976		1977		1978	
<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>
None		None		None		Rockfish	100	None	

SANTA CRUZ BASIN

1974		1975		1976		1977		1978	
<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>	<u>Species</u>	<u>#</u>
Rockfish	190,084	Rockfish	164,309	Rockfish	196,419	Rockfish	146,528	Rockfish	116,741
Lingcod	7,611	Lingcod	8,664	Lingcod	10,661	Lingcod	3,995	Lingcod	4,862
Salmon	3,410	Salmon	4,522	Salmon	2,270	Salmon	1,988	Salmon	2,497
Flounder	1,221	Flounder	3,671	Flounder	1,768	Striped		Cabazon	1,280
Cabazon	875	Cabazon	655	Cabazon	1,205	bass	618	Flounder	574
Sanddab	280	Sanddab	340	White		Cabazon	468	White	
White		Pacific		croaker	362	White		croaker	266
croaker	254	hake	175	Sanddab	331	croaker	372	Sanddab	72
Jack		White		Pacific		Flounder	257		
mackerel	70	croaker	139	hake	302				
Blue shark	64	Striped bass	100	Albacore	145				
				Blue shark	78				

TABLE III.B.2.b-3 (Cont.)

SANTA MARIA BASIN

1974		1975		1976		1977		1978	
Species	#	Species	#	Species	#	Species	#	Species	#
Rockfish	237,665	Rockfish	211,505	Rockfish	183,172	Rockfish	137,578	Rockfish	134,077
Lingcod	6,054	Lingcod	6,129	Lingcod	4,097	Lingcod	2,432	Lingcod	4,065
Flounder	1,220	Flounder	831	Cabazon	986	Cabazon	1,628	Cabazon	2,306
Cabazon	537	Cabazon	595	Albacore	916	Flounder	561	Flounder	437
Salmon	368	Petrals		Flounder	817	Salmon	119	Halfmoon	113
Cowcod	130	sole	114	Salmon	123			Salmon	104
		Salmon	79					Pacific	
		Albacore	71					mackerel	66
								Petrals	
								sole	56

^aSource: Catch by origin data obtained from the California Department of Fish and Game utilizing the statistical catch blocks listed on Table III.B.1-2.

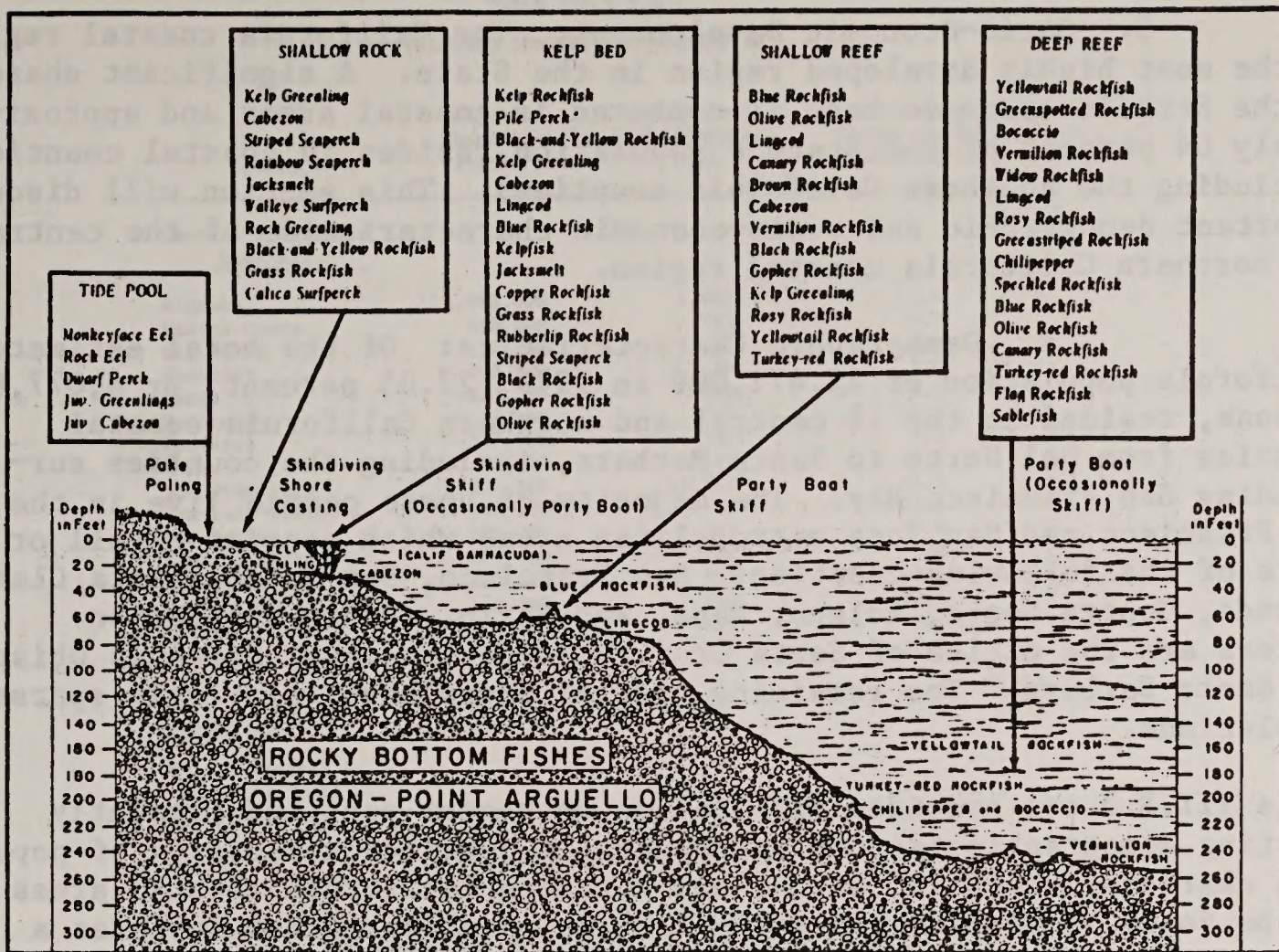


Figure III.B.2.b-1 Most Commonly Taken Species in Rocky Bottom habitats, Oregon-Point Arguello. (From Miller and Gotshall 1965).

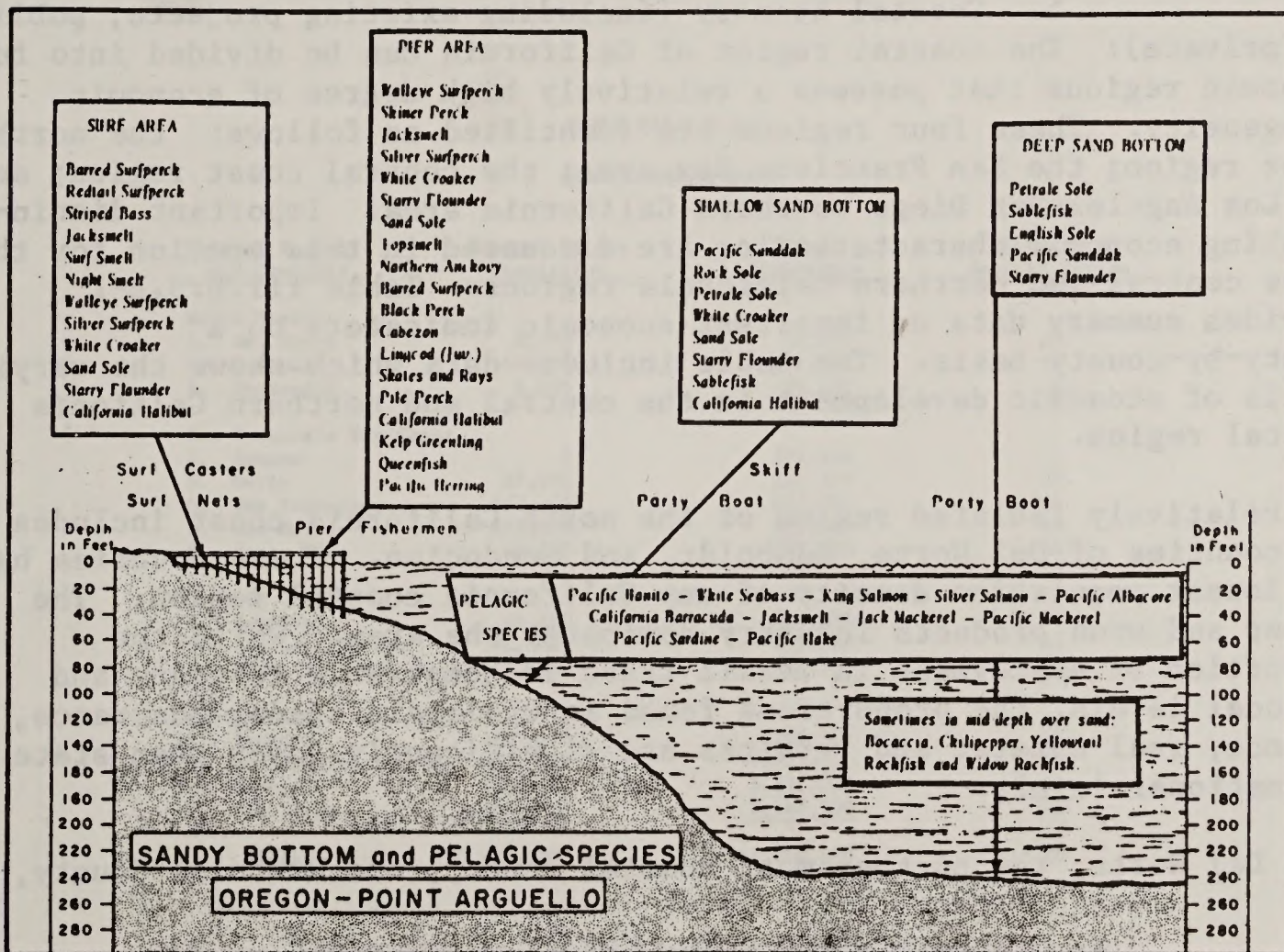


Figure III.B.2.b-2 Most Commonly Taken Species in Sandy Bottom and pelagic habitats. (From Miller and Gotshall 1965).

3. Socio-Economic Development: The California coastal region is the most highly developed region in the State. A significant share of the State's economic base is centered in coastal areas and approximately 64 percent of the State's population resides in coastal counties (including the southern California counties). This section will discuss important demographic and socio-economic characteristics of the central and northern California coastal region.

a. Demographic Characteristics: Of the total estimated California population of 22,471,000 in 1979, 27.05 percent, or 6,077,800 persons, resided in the 16 central and northern California coastal counties from Del Norte to Santa Barbara, including the counties surrounding San Francisco Bay. The majority of these people live in the San Francisco and San Jose metropolitan areas which consist of all or parts of the following counties: San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Solano, Napa, and Marin. Other population centers are the cities of Santa Cruz, Monterey-Salinas, San Luis Obispo, and Santa Barbara. The remaining coastal areas have relatively sparse populations.

Table III.B.3.a-1 provides information on recent past and presently existing demographic factors by county. A detailed discussion of population characteristics in central and northern California coastal areas can be found in Winzler and Kelly (1977). Section IV.B.3 includes a discussion of future population levels, both with and without proposed Sale No. 53. Table III.B.3.a-2 shows coastal urban areas.

b. Coastal Economy (including existing projects, public and private): The coastal region of California can be divided into four economic regions that possess a relatively high degree of economic homogeneity. These four regions are identified as follows: the north coast region; the San Francisco Bay area; the central coast region; and the Los Angeles-San Diego southern California area. Important distinguishing economic characteristics are discussed in this section for the three central and northern California regions. Table III.B.3.b-1 provides summary data on important economic indicators on a county-by-county basis. The table includes data which shows the varying levels of economic development in the central and northern California coastal region.

The relatively isolated region of the north California coast includes the counties of Del Norte, Humboldt, and Mendocino. These counties have the lowest population density of any California coastal region. The lumber and wood products industry dominates the area. While the proportion of employment in retail trade is comparable to state and national levels, the proportions found in wholesale trade, insurance, finance, real estate, and services are significantly lower than state and national levels.

Both Del Norte, the northernmost coastal county, and Humboldt County,

TABLE III.B.3.a-1
SELECTED DEMOGRAPHIC STATISTICS

County	Estimated Population 1-1-79 ^a	Pop. Density Per Square Mile	Percent Change in Pop. (1970-1975)
<u>Central & Northern Coastal:</u>			
Alameda	1,098,600	1,488	1.6
Contra Costa	618,200	795	5.0
Del Norte	17,250	16	7.2
Humboldt	106,800	30	5.5
Marin	222,300	424	3.5
Mendocino	64,400	17	12.7
Monterey	277,500	81	7.5
Napa	93,900	115	14.2
San Francisco	657,200	14,767	-6.5
San Luis Obispo	142,900	41	23.1
San Mateo	586,000	1,300	2.8
Santa Barbara	293,700	102	5.8
Santa Clara	1,235,300	903	10.1
Santa Cruz	175,500	355	22.4
Solano	213,900	227	8.9
Sonoma	274,300	154	19.9
<u>Total California:</u>			
Total (Central & Northern Calif. Coastal Counties)	6,077,800	245	5.0
California	21,471,000	135	5.8

^aState of California, Population Research Unit, May 1, 1979, "Population Estimates of California Cities and Counties, January 1, 1978 and January 1, 1979."

Source: U.S. Department of Commerce, Bureau of the Census, 1977, City and County Data Book.

TABLE III.B.3.a-2
COASTAL URBAN AREAS

<u>Coastal Regions and Counties</u>	<u>Coastal Cities Population</u>	<u>County Population</u>	<u>Percent in Coastal Cities</u>
<u>North Coast</u>			
1. Del Norte	2,710	17,250	16
2. Humboldt	46,870	106,800	44
3. Mendocino	5,655	64,400	9
<u>San Francisco Bay/Coast</u>			
4. Sonoma	0	274,300	0
5. Marin	87,485	222,300	39
6. San Francisco	657,200	657,200	100
7. San Mateo	521,000	586,000	80
8. Santa Cruz	48,800	175,500	28
<u>Central Coast</u>			
9. Monterey	69,450	277,500	25
10. San Luis Obispo	32,300	142,900	23
11. Santa Barbara	113,590	293,700	39
<u>South Coast</u>			
12. Ventura	149,500	488,900	31
13. Los Angeles	691,650	7,125,700	10
14. Orange	450,700	1,851,000	24
15. San Diego	1,107,075	1,767,500	63
TOTALS	3,983,985	14,050,950	28

Source: California Department of Water Resources, Land Use Within the California Coastal Zone, October 1978.

TABLE III.B.3.b-1

SELECTED ECONOMIC STATISTICS

County	Percent Employed in Manufacturing	Percent Employed in Wholesale and Retail Trade	Per Capita Income (1974)	Average Annual Change in Per Capita Income (1969-1974)	Value Added by Manufacturing 1972 (Mil. of \$)	Gross County Product 1975 (Mil. of \$) ^a
Alameda	19.1	20.2	\$5,341	7.3	\$ 1,778.1	\$ 6,820.7
Contra Costa	20.6	20.3	5,870	7.8	637.7	4,077.6
Del Norte	27.3	20.2	4,169	7.8	31.8	86.5
Humboldt	25.0	21.4	4,411	7.6	220.6	543.4
Marin	9.5	20.7	7,150	8.0	63.3	1,098.4
Mendocino	23.1	19.0	4,142	7.1	95.6	245.7
Monterey	10.3	24.5	4,688	8.0	217.8	1,575.6
Napa	19.2	18.2	4,609	6.9	71.4	370.6
San Francisco	11.7	20.4	5,990	6.9	727.5	10,621.3
San Luis Obispo	5.9	21.8	4,163	7.5	26.5	432.8
San Mateo	17.9	22.8	6,621	7.5	601.3	4,934.5
Santa Barbara	12.4	21.4	4,756	7.0	169.7	1,425.3
Santa Clara	30.6	18.5	5,605	7.5	2,873.7	8,680.5
Santa Cruz	16.1	22.9	4,641	7.6	122.9	493.6
Solano	20.6	20.4	4,581	7.9	94.3	934.0
Sonoma	12.7	23.2	4,501	7.6	136.7	836.2
The State	21.6	21.1	\$5,114	6.9	\$31,175.2	\$139,307.5

^aBased on Curtis Harris Economic Forecasting Model. Information for 1975 expressed in constant 1972 dollars. For a discussion of the model, see Section IV.A.6.

Source: U.S. Department of Commerce, Bureau of the Census, 1977, City and County Data Book.

directly to the south, have a significant economic dependence on the lumber and wood products industry. A general lack of diversification exists within the manufacturing sector in both areas. In recent years, up to 80 percent of total regional value added has been derived from lumber and wood products. During the past 20 years, there has been a concomitant secular decline in the timber industry. Because of the significant unemployment that has resulted, the increase in per capita income in the area has been below state and national averages. Crescent City, a small seaport and lumbering town, is the population center for Del Norte, lying 375 miles north of San Francisco. Eureka is the major population center for Humboldt County, located on the 12-mile long navigable Humboldt Bay.

Similarly, the Mendocino County economy is dominated by lumber and wood products manufacturing. Employment in this sector, however, has been declining in Mendocino as well. Light industry and tourism have begun to have some impact on county income in recent years. The growth of recreation has resulted in some growth in both the services and trade sectors in the local economy. However, other sectors remain quite small relative to the income generated from wood products, based on value-added and employment. Fort Bragg is the most important coastal city, while Ukiah is the important inland commercial center.

The second coastal region, the San Francisco Bay area, includes the Pacific-adjacent counties of Sonoma, Marin, San Francisco, and San Mateo. Five other counties, Napa, Solano, Contra Costa, Alameda, and Santa Clara, are commonly included in the greater San Francisco Bay area because of the regional and economic integration that exists. This populous region is a highly developed and diversified area.

San Francisco City and County functions as the administrative center of the Bay area, providing headquarters for many financial, transportation, manufacturing, and government establishments. San Francisco also acts as the region's focal point for many specialized trade and service activities and also has extensive port facilities. Marin and Sonoma counties lie immediately to the north. The cities of San Rafael and Santa Rosa act as the major trade and service centers for each county, respectively. Marin County is primarily residential with more than one-half of the employed residents working in other Bay Area counties. Sonoma has had a steadily rising population and a rapid growth rate in recent years -- nearly three times that of the State as a whole. Sonoma's rural atmosphere has attracted an increasing number of residents who are willing to commute considerable distances to work. In addition, the county has been able to attract numerous manufacturing firms, thereby increasing the importance of the industrial sector, because of relatively reasonably priced industrial locations and a skilled labor supply.

Napa is the least populated of the nine Bay area counties. Napa Valley's four incorporated cities are surrounded almost exclusively by

vineyards. The mountain ranges have elevations to 1,340 m (approximately 4,400 feet) and are a major recreational resource for the entire San Francisco Bay area. Solano County, directly to the east, contains Vallejo and Benicia, an important industrial and oil refining center. Both cities offer important deep-water ports to the Bay area. The northern part of the county is a center for grain, field crops, livestock, and food processing operations.

The East Bay area of Contra Costa and Alameda counties is a rather diverse area, ranging from industrial flatlands near the Bay to suburban foothills in the east. The city of Richmond in Contra Costa marks the north end of the East Bay industrial corridor. Excellent transportation facilities are provided by railroads and a major deepwater port. Oakland has historically been the industrial heart of the Bay area and has developed into a major financial, commercial, and government center.

Santa Clara and San Mateo counties form the Bay area's southern boundary. Santa Clara has had some of the largest gains in employment of any California metropolitan region during the last two decades. Much of this growth has centered in and around its principal city, San Jose. Although there exists a variety of manufacturing activities in the Santa Clara Valley, two industries--food processing and aerospace--dominate the manufacturing sector. San Mateo County is characterized by a lightly populated western part on the Pacific side and a heavily populated eastern corridor between San Francisco and San Jose. Long a residential suburb to nearby San Francisco, the eastern part has had considerable commercial expansion in recent years because of its convenient access to nearby population centers, whereas the western part bases its economy on agriculture, fishing, lumber, and visitor service facilities.

The third coastal region lies south of the Bay area and extends to the Los Angeles metropolitan area. It includes the central coastal counties of Santa Cruz, Monterey, San Luis Obispo, and Santa Barbara. In this region, the manufacturing sector is largely overshadowed by the recreation and agriculture sectors.

In both Santa Cruz and Monterey counties, a relatively high percentage of employment and value added results from truck farming and food processing. With locations convenient for many California metropolitan areas, the cities of Santa Cruz and Monterey are also important visitor centers. Important tourist-oriented economic sectors exist in both counties. Manufacturing employment represents a much smaller share of total employment in the region than in California as a whole. Within manufacturing, food processing is the most important industry in terms of value of goods produced.

San Luis Obispo and Santa Barbara Counties are similarly dominated by the recreation and agriculture sectors in their economies. San Luis Obispo County's economic center for trade and services, as well as

tourism, resides in and around its major city, San Luis Obispo. Recreation-oriented activities are also important in several coastal communities. Within the manufacturing sector, non-durables, specialized fabrication, or commercial services tend to be more important since these sectors are less dependent on raw materials, transportation, and large pools of semi-skilled labor. Much of Santa Barbara County is either farmed or cultivated. Los Padres National Forest covers approximately 44 percent of total land area in the eastern part of the County. The southern coastal region, particularly the city of Santa Barbara and the immediate surrounding areas, are favorites of tourists and retired persons. Agriculture is more important in northern Santa Barbara County, the major farming areas being Santa Maria, Guadalupe, and Lompoc.

Table III.B.3.b-1 gives selected economic statistics on a county-by-county basis for the central and northern California coastal region. It includes those important variables, such as per capita income and percent employed and value added in manufacturing, to give an indication of the level of county economic development and also allows for relative comparisons between counties.

As noted in Section I.B.8.c, other proposals and public and private projects will be ongoing in the central and northern California coastal area during the life of proposed OCS Sale No. 53. A description of, and the developmental assumptions for, these projects and proposals follows. Although a multitude of possible projects are likely to come on line during the 20-30 year life of the Sale proposal, emphasis is given here to those projects which, because of the use of similar labor inputs and/or other factors of production and resources, may involve important regional economic adjustments. Note is also made of other energy-related projects, as these may also require certain societal adaptations because of the resulting substitution between energy sources. Thus, those important projects and proposals are noted which, taken together with Sale No. 53, may have significant cumulative impacts.

i. Navigation Improvement Project, Humboldt Harbor and Bay: Humboldt Bay, located at the city of Eureka in Humboldt County, is one of the few natural deep water harbors on the West Coast of the U.S. It is the only deep water port between San Francisco, 270 miles to the south, and Coos Bay, 230 miles to the north. The Bay is considered a deep water harbor, in spite of its general shallowness, because of the naturally deep channels within it. These natural deep channels are used for navigation. Some require dredging. The U.S. Army Corps of Engineers has maintained channels in Humboldt Bay since 1881.

The Corps has had a current navigation improvement project for Humboldt Bay and Harbor which is designed to increase channel depths and widen certain reaches in North Bay. These improvements are to make it possible for larger ships to 11.3 m (37 feet) in draft and approximately

230 m (750 feet) in length to call on the Bay without experiencing inordinant tidal delays or sailing partially loaded due to restricted draft. The Corps has also been preparing plans for navigation improvement for the Fields Landing Channel in South Bay. Channel depths of 9.1 to 10.7 m (30 to 35 feet) are being considered. Since the worldwide trend is toward larger and more efficient ships, there could be further needs to improve navigation by the year 2000. The Corps of Engineers has indicated that the channel depths in North Bay could ultimately reach 12.2 m (40 feet).

ii. Manchester Anticline Petroleum Project, Mendocino County: Griffin and Associates have proposed drilling an initial exploratory production well in order to evaluate possible petroleum resources in southern Mendocino County. The Griffin leasehold involves 1,264 acres south of the town of Manchester, and is comprised of lease arrangements with three separate landowners. If the exploratory well is successful, the second phase would commence consisting of up to 40 additional wells. (This is the maximum numbers of wells considered, based on site geology, and may not reflect the intentions of the project sponsor). The specific location of development wells is unknown at this time. Well placement is indeterminant until data is collected concerning the nature and extent of the oil-bearing formations through the drilling of the initial exploratory well.

iii. Power Plant, Contra Costa County: In April 1978, Pacific Gas and Electric submitted a Notice of Intention to the California Energy Commission to construct a combined cycle power plant approximately 3 miles west of Pittsburg, California in Contra Costa County. At the present time, technical aspects of the proposed power plant and related facilities are being further delineated, and potential issues and concerns which may affect the certification of the proposed project are being analyzed by the Commission.

iv. Diablo Canyon Nuclear Power Plant: A newly constructed power plant is located at Diablo Canyon in San Luis Obispo County, California. The nuclear power facility is located on a coastal terrace 6 miles south of Montana de Oro and 8 miles north of Point San Luis. Although construction is completed, start up permission for the plant has been delayed.

The Atomic Energy Commission granted the initial permit to build the nuclear portion of the first unit in 1968. Diablo Canyon consists of two 1060-MW(e) pressurized water reactors and necessary auxiliary equipment. Operations employment is projected to be 200 persons for the life of the project.

v. Space Shuttle Program, Vandenberg Air Force Base, California: In January 1972, the U.S. Government announced its intention to proceed with the development of a new type of space trans-

portation system, one designed to place an emphasis on the utilization of space for more directly beneficial endeavors rather than on the pioneering explorations that have characterized this country's manned space flight programs to date.

Missions will be flown from both Cape Canaveral and Vandenberg Air Force Base in Santa Barbara County, California. Orbiters will be able to land at either site. The first operational space flight is scheduled for mid-1980.

The Space Shuttle System is an advanced state-of-the-arts program that will utilize new materials, innovative processes, and high technology support equipment and subsystems. The National Aeronautics and Space Administration (NASA) and the U.S. Air Force have jointly established program objectives, priorities, and overall allocation of resources for the Space Transportation System. Development, operations, and logistic requirements will be shared by the two agencies. During the 1980's, NASA estimates that the Shuttle will make close to 600 flights into space. The peak year should be 1984, when 60 flights are projected.

The project will continue as long as the Shuttle is technologically and economically viable. The annual launch rate will depend on the economics of operation at any particular time. Total operations expenditures will equal almost \$1.1 billion. At Vandenberg, the number of jobs are expected to be variable, ranging from 1,618 to 1,941. Subsystems engineering, technicians, and technical (Base) support will constitute the largest percentage of total personnel--15 percent, 23 percent, and 43 percent, respectively.

vi. Liquified Natural Gas (LNG) Facility: Final approval was given by the Department of Energy on September 27, 1979 for construction of a liquified natural gas (LNG) terminal at Point Conception (Little Cojo Bay) in Santa Barbara County. The terminal would receive, store, and regasify liquified natural gas derived from gas produced in Indonesia and South Alaska.

The facility would be built by Western LNG Terminal Associates, a subsidiary of Pacific Gas and Electric Co. of San Francisco and Pacific Lighting Corp. of Los Angeles. The site would involve a 209-acre industrial complex, and in 1984 would have an initial capacity of 0.9 billion cubic feet per day. The input capacity could be expanded at a later date to the maximum allowable of 1.3 billion cubic feet, and have an LNG storage capacity of up to 1.65 million barrels. In terms of shipping activity, the LNG facility could mean the annual arrival of approximately 190 tankers at the Point Conception site per year or approximately one every two days.

vii. Resumption of Drilling on State Tidelands Leases: ARCO Oil and Gas Company (operator) and Aminoil U.S.A., Inc. as lessees on offshore tracts in the Santa Barbara Channel (Coal Oil Point

Area) have proposed resumption of drilling to further evaluate the hydrocarbon potential of the Monterey formation. Extraction of recoverable oil and gas reserves from the Monterey formation is the primary objective for future development of these leases.

Evaluating the hydrocarbon potential would involve testing the formation in one or more of the existing wells, and the drilling of one or more new wells, if required, from a floating or mobile drilling vessel. Should commercial quantities of oil and gas be obtained from these wells, up to six delineation wells would be drilled to determine areal extent of the productive zones. Full-scale field development could include the possible installation of one or more new offshore platforms, which would require further approval from the State Lands Commission. All work would be done in compliance with offshore regulations recently promulgated by the State Division of Oil and Gas, and with all safety and antipollution regulations adopted by Federal, State, and local agencies.

viii. Existing Santa Barbara Channel and Southern California OCS Leases: A total of 145 tracts (773,284 acres) are presently in OCS lease status in the Southern California Borderland. This includes 38 tracts leased in Santa Barbara Channel OCS sales in 1966 and 1968, and 53 tracts leases as a result of OCS Sale No. 35 in 1975. Of the original 217 tracts included in the environmental analysis for OCS Sale No. 48, 54 tracts were ultimately leased as a consequence of the Sale held in June 1979. USGS estimates that oil and gas resources included in all presently leased areas totals 1.10 billion barrels of oil and 2.88 trillion cubic feet of gas. USGS further estimates peak production from existing leased areas to occur in 1989 with 76.8 million barrels of oil and 177.13 billion cubic feet of gas at that time. The exploratory activities, facilities, and transportation systems necessary for development of these OCS resources are described in EIS's written for Sale Nos. 35 and 48. Further information is included in Developmental EIS's written on particular lease units prior to the developmental phase.

4. Coastal Land Use: Land use within the coastal zone boundary of central and northern California is presented in Table III.B.4-1 by county and type of land uses. The data is presented both in acres and as a percentage of total county acreage. Agriculture includes irrigated and non-irrigated agricultural and semi-agricultural land uses. The latter includes lawns, cemeteries, dairies, feedlots, and farmsteads. Some parkland may be included in the agriculture category, as in the San Francisco area, for example. The Native category includes native vegetation (brush and forest), riparian vegetation (marsh, swamp, and meadowland), water surface (lakes, reservoirs, rivers, bays and estuaries), and barren areas (including sand dunes). The Native category also includes the majority of coastal parkland. Additional data, on commercial and non-commercial forest lands, is presented in Table III.B.4-2. Forestry is an important industry in central and northern California counties. The recreation category includes only residential and commercial uses within a predominantly recreational area. Camp and trailer sites are also included. The parkland itself is not necessarily included therein (see above).

Urban land use within the coastal zone is further segregated out in Table III.B.4-3 according to residential, commercial, industrial, mixed, and vacant. The mixed category includes residential, commercial, and industrial where it was not possible to separate out these uses according to the technique used for the survey (aerial photography). Residential refers to one and two family units and trailer courts. Commercial includes institutions, retail and office use, apartments (3+ family units), and hotel and motels where they occur outside recreational areas. The industrial category includes industrial uses, such as manufacturing, extractive industries, storage, and airfields.

Land use for the Association of Bay Area Governments (ABAG) member counties is shown in Table III.B.4-4.

The data in Tables III.B.4-1 and -3 has been obtained from the California Department of Water Resources (1978). Tables III.B.4-2 and -4 are from the Winzler and Kelly (1977) study which includes additional information land references on land use in the central and northern California region.

The following discussion of coastal land use is based on available LCP documents and the California Coastal Plan (1975).

a. North Coast - Del Norte, Humboldt and Mendocino Counties: This region is sparsely populated with small towns, generally, along the Highway 1 and 101 corridors. The major land uses are: forestry, agriculture, commercial and recreational fishing, recreation, parklands, (including Redwood National Park and the Redwood National Forest, and a number of ocean frontage parks), and tourism. There is also extensive public ownership of parklands in this area

TABLE III.B.4-1

LAND USE WITHIN THE COASTAL ZONE
(ACRES/% OF TOTAL)

County	Agriculture	Native	Urban ^a	Recreation ^b	Military ^c	Total
Del Norte	8,307 17.0%	35,080 72.0	5,217 10.7	123 d	18 d	48,727
Humboldt	35,941 27.6	87,193 67.1	6,807 5.2	65 d	593 d	130,006
Mendocino	3,424 3.7	83,048 89.6	5,160 5.6	1,012 1.1	222 d	92,644
Sonoma	267 d	52,854 93.7	519 d	2,528 4.5		56,379
Marin	545 d	90,351 97.9	1,199 1.3	195 d	860 d	92,290
San Francisco	559 29.9	949 50.7	366 19.6	d	155 d	1,871
San Mateo	20,061 20.4	74,995 76.4	3,088 3.1	1 d	58 d	98,145
Santa Cruz	8,588 12.0	58,350 81.1	4,997 6.9	c		71,935
Monterey	14,840 7.3	181,602 88.9	6,579 3.2	d	1,194 d	204,195
San Luis Obispo	10,577 6.6	146,303 91.4	3,210 2.0	8 d		160,098
Santa Barbara	9,170 8.1	98,571 87.5	4,845 4.3	31 d		112,614

^aFor a further breakdown of Urban Land uses, see Table III.B.4-3.

^bRecreation is defined by the California Department of Water Resources (CDWR) as: Residential (permanent and summer homes); Commercial (motels, resorts, hotels, stores, etc.); and camp and trailer sites. Land used for recreation by the public is often not categorized as Recreation Land (i.e., beaches are often categorized as Agricultural or Native). (See Section III.B.2.)

^cMilitary Land use may also be counted into the other land use categories. Recreation Land use within these counties is included by CDWR in Agriculture, Native, and Urban designations (see Section III.B.1).

^dLess than 1 percent.

Source: California Department of Water Resources, Land Use Within the California Coastal Zone, October 1978.

TABLE III.B.4-2

COMMERCIAL AND NON-COMMERCIAL FOREST LANDS
IN COASTAL STUDY AREA, BY COUNTY - 1965^a

County	Total Forest Land	Commercial Forests	Non- Commercial Forests	Forest Land as % County Land
Alameda	83,000	0	83,000	18
Contra Costa	59,000	0	59,000	13
Del Norte	607,000	487,000	107,000	95
Humboldt	1,850,000	1,701,000	102,000	81
Marin	119,000	32,000	87,000	36
Mendocino	1,914,000	1,905,000	609,000	85
Monterey	1,128,000	17,000	1,107,000	53
Napa	356,000	39,000	317,000	73
San Francisco	0	0	0	0
San Luis Obispo	806,000	1,000	805,000	38
San Mateo	127,000	59,000	65,000	44
Santa Barbara	988,000	3,000	984,000	56
Santa Clara	422,000	24,000	396,000	51
Santa Cruz	190,000	125,000	56,000	68
Solano	53,000	0	53,000	10
Sonoma	553,000	292,000	256,000	55

^aMore recent data may be available from U.S. Forest Service unpublished studies and other sources. However, this is the most recent published data source.

Source: U.S. Forest, Pacific Southwest Forest and Range Experiment Station, "Present and Prospective Development of the Timber Resources and Forest Industries; reproduced in California Department of Finance, California Statistical Abstract, 1976.

TABLE III.B.4-3

URBAN LAND USE WITHIN THE COASTAL ZONE^a
(ACRES)

County	Land Use Category					Total
	Residential	Commercial	Industrial	Mixed ^b	Vacant	
Del Norte	21 0.4%		289 5.5	3,795 72.7	1,112 21.3	5,217
Humboldt	26 0.4		1,570 23.1	3,888 57.1	1,285 18.9	6,807
Mendocino	2,055 39.8	4 0.1	432 8.4	895 17.3	1,774 34.4	5,160
Sonoma	150 28.9	23 4.4	36 6.9	247 47.6	63 12.1	519
Marin	1,073 89.5	40 3.3	4 0.3	72 6.0	10 0.8	1,199
San Francisco	80 21.9	251 68.6			35 9.6	366
San Mateo	499 14.5	297 9.6	127 4.1	1,326 42.9	889 28.8	3,088
Santa Cruz				4,811 96.3	186 3.6	4,997
Monterey				6,566 99.8	13 0.2	6,579
San Luis Obispo	2,214 69.0	427 13.3	446 13.9		123 3.8	3,210
Santa Barbara	2,883 59.5	721 14.9	757 15.6		484 10.0	4,845

^aMay contain military land uses.

^bThe mixed category includes residential, commercial, and industrial where it was not possible to separate out these uses according to the technique used for the survey (aerial photography).

Source: California Department of Water Resources, Land Use Within the California Coastal Zone, October 1978.

TABLE III.B.4-4

ABAG REGIONAL LAND USE

County	Land Use Categories				Total Land Area
	Urbanized	Residential ^a	Undeveloped Available	Unusable ^b	
San Francisco	20,343 67.5%	9,441 31.3	1,195 4.0	9,572 28.4	30,109
Marin	25,953 7.8	17,093 5.1	27,207 8.2	279,945 84.0	333,375
Sonoma	22,719 2.3	13,704 2.4	53,336 5.3	931,796 93.1	1,000,851
Napa	11,681 2.3	6,121 1.2	18,678 3.6	479,295 94.2	509,048
Solano	18,458 3.5	6,652 1.2	13,588 2.6	496,354 94.0	528,400
Contra Costa	86,801 18.3	43,334 9.2	99,387 21.0	287,382 60.7	473,570
Alameda	87,923 18.9	49,009 10.5	42,464 9.1	334,329 71.9	464,716
Santa Clara	124,041 14.6	55,834 6.6	55,409 6.5	667,620 78.8	847,070
San Mateo	57,206 16.3	31,656 9.0	28,780 8.2	265,143 75.5	351,116

^aResidential land use is a sub-category of urbanized land use in the PLUM classification. Hence, the sum of data entries will exceed the total figure for each county.

^bUnusable area refers to inland bodies of water, land designated as permanent open space, and most of the controlled development open space in the ABAG Regional Plan 1970-1990.

Source: Association of Bay Area Governments Projections of the Region's Future, Series 2, September 1974.

(especially in Humboldt County) with heavy residential uses. The major land use concerns identified are the following: maintenance of existing open space, maintenance of the scenic and visual qualities, ensuring the quality of design of new development to enhance the rural character of the areas, protection against the conversion of agricultural and timberlands to other uses, and the attraction of new industry compatible with resource protection concern. There is a desire in certain areas to attract new industry to provide employment and reduce cyclical unemployment of areas heavily dependent on the lumber and tourist industries (such as Crescent City).

b. North Central Coast - Sonoma, Marin, and San Francisco: In Sonoma and Marin Counties the major land uses are: coastal agriculture, forestry, commercial and recreational fishing and parklands. The latter include the Golden Gate National Recreation Area and the Point Reyes National Seashore. These occupy much of the coastal land in Marin and San Francisco Counties. Recreational second home developments are also important in this area. The Audubon Canyon Ranch in Marin County has been designated as a National Natural Landmark by the Heritage Conservation and Recreation Service. The major land use concerns are: protection of natural resources; long range protection of coastal agriculture, forestry, commercial and recreational fishing, and enhancement of tourism and recreation uses. In San Francisco County, the coastal areas are nearly totally developed with the main land uses being residential and recreational. The Farallon Islands will remain in a wildlife refuge status.

c. Central Coast - San Mateo, Santa Cruz, and Monterey Counties: The major land uses in this region are: commercial agriculture, floriculture, residential, recreation, commercial fishing, forestry, and parklands (a number of which have ocean frontage). Point Lobos in Monterey County has been designated as a National Natural Landmark. The major land use concerns are: coastal access, water quantity and quality, preservation of agricultural lands, use conflicts between commercial development and environmentally sensitive habitats, cumulative development impacts, preservation of rural life styles, preservation of open spaces, and improvement of recreational and visitor serving facilities.

d. South Central Coast - San Luis Obispo and Santa Barbara Counties: In San Luis Obispo the major land uses are: agriculture, recreation, tourism, and residential. In the northern portion of the county, grazing and agricultural uses predominate, with large ranches characterizing the open space uses. There are also three large energy facilities within the county: Diablo Canyon Nuclear Power Plant, a tanker loading facility at Canyucos, and an oil pier with an adjacent tank farm at Avila State Beach. San Luis Obispo also has a large number of ocean frontage recreation areas, especially in the southern portion. Montana De Oro and Morro Bay State Parks are two of the largest recreational areas in the county.

In Santa Barbara County the major land uses are: agricultural, energy facilities, educational (University of California at Santa Barbara), residential, recreational, parklands, and tourism. The northern coastline is generally rugged and rural, consisting of rolling hills, mountains, rocky headlands, steep bluffs, and extensive sand dunes. The southern coastline is generally urbanized. Oil and gas related development is currently the principal industrial activity in the southern coastal zone and the land uses reflect this. The county also has a significant number of ocean frontage recreational areas (parklands and beaches). Nipomo Dunes-Point Sal has been designated as a National Natural Landmark. Portions of the Los Padres National Forest are also within the county's coastal zone.

A discussion of the role of the various industries in the regional economy may be found in Section III.B.2.b. Section III.D.2 includes a discussion of the expected changes in land use without the proposed action and some of the constraints to, or opportunities for, growth.

Specific information on land use in harbors and ports will be available in early 1981. BLM is funding a study addressing space use conflicts between the commercial and sportfishing industries and the oil and gas industry, "Assessment of Space and Use Conflicts on the U.S. Outer Continental Shelf Between the Oil and Gas Industry and Commercial and Recreational Fishermen". The study will discuss the resources (land, labor, etc.) needed for both industries on a national scale and for eleven specific ports and harbor areas in California. The study will be completed in early 1981, prior to the Final Notice of Sale for Sale No. 53.

5. Transportation Systems

a. Ports and Shipping: The Port and Tanker Safety Act of 1978 amends the Port and Waterways Safety Act of 1972 and provides for the designation of Port Access Route (PAR) in order to furnish safe access routes for the movement of vessel traffic proceeding to or from ports and places subject to the jurisdiction of the United States. A PAR might take the form of Shipping Safety Fairway (SSF), a Traffic Separation Scheme (TSS), or a similar routing measure. Prior to the designation of routing measures, or the determination that none are required, the Act requires the Coast Guard to conduct a Port Access Route Study to measure traffic density, conflicting uses of the area under consideration, and the need for these routing measures.

The Eleventh and Twelfth Coast Guard Districts are conducting the PAR study for those areas included in OCS Lease Sale No. 53. The completion date for the data collection period is June 1, 1980, with publishing of the study results and routing proposals by January 1, 1981.

It is unlikely that the routing measures resulting from the study will be established prior to the May 1981 lease sale. By that date, a proposed rulemaking will have been published in the Federal Register. Depending upon the nature of comments submitted on the proposed rulemaking, a final rulemaking may also be published prior to the sale. Intergovernmental Maritime Consultative Organization (IMCO) adoption of the routing measures before the sale is unlikely.

Although adoption of routing measures is unlikely, by the Lease Sale No. 53 date, the Coast Guard should have a good idea as to what routing measures are likely and where they will be located.

The U.S. Coast Guard, District 12, is proposing a traffic separation scheme (TSS) which extends about 576 statute miles (500 nautical miles) (nm) from Point Conception to the California-Oregon Border with entrances to Humboldt Bay, San Francisco Bay, and Estero Bay (Jenkins, G. Lt., June 1979). This TSS has two 1-nm wide traffic lanes with a 2-nm separation zone. Entrances at the Humboldt and Estero Bays are 1-nm wide. The existing TSS at the entrance to San Francisco Bay is modified for the Proposed TSS by deletion of north and south traffic lanes and extension of west traffic lanes. Extension of the existing south traffic lanes (TSS) is being considered as a possible PAR route for the southerly access to and from the San Francisco Bay. This southerly access could have major impact on the oil and gas development for the proposed Santa Cruz area tract selection.

The above proposed Point Conception to the California-Oregon Border TSS is one of several alternatives that are being considered and may not be the final proposed emerging from the PAR study.

Total freight traffice for ports between Point Conception to

California-Oregon Border for calendar year 1977 is tabulated in Visual No. 2. Presently over 265 petroleum tankers per year service Estero Bay (175) and Port San Luis (90) (San Luis Obispo County 1980).

b. Pipeline System: The onshore pipelines, which include natural gas and crude oil, are illustrated in Visual No. 2. Natural gas is transported by pipelines by PG & E, Southern California Gas (SCG) and Standard Pacific. PG & E has relied on three sources of natural gas supply for distribution in California markets: (1) gas from the southwest delivered at the Arizona-California border by El Paso Natural Gas Company (El Paso), (2) gas from Alberta, Canada, delivered by Pacific Gas Transmission Company (PGT), and (3) gas from producing fields within California. The Canadian gas is transported by the Pacific Gas Transmission pipeline from Canada to the Oregon-California Border where PG & E connects their 36-inch transmission pipeline and supplies the central and northern California area. The Texas gas is transported by the El Paso Natural gas pipeline from Texas to the Arizona-California Border where PG & E and SCG connect their pipelines and supply the southern California area. Since 1973, the El Paso system has been curtailed, and the quantities of natural gas which PG & E has received from El Paso have been substantially reduced. In 1978, El Paso supplied 35 percent of PG & E's total natural gas purchases, while about 48 percent of its natural gas supply came from Canada. More than 60 percent of the Canadian export volume is subject to expiration by the end of 1986. PG & E received approximately 17 percent of its natural gas supply from California producers in 1978. However, net additions to reserves of gas in California have not kept pace with the decline in supply from existing California fields. Overall, PG & E has found it necessary to impose increasing curtailments on industrial customers. PG & E projects that its high priority customers face curtailment by the 1983-84 winter heating season if supplies from traditional areas are not substantially augmented. PG & E transports gas to the coastal counties from San Luis Obispo to the San Francisco Bay area in a 34-inch pipeline. SCG supplies Santa Barbara and San Luis Obispo counties in a 30-inch pipeline. Standard Pacific supplies Contra Costa County.

Crude oil is transported to the San Francisco Bay area refineries by pipelines from Bakersfield. Visual No. 2 illustrates these crude oil pipelines. A 20-inch Getty pipeline supplies Exxon and Shell refineries. Ten, 12 and 18-inch Chevron pipelines supply their refinery at Richmond. Eight and 16-inch Union pipelines supply their refinery at Rodeo.

There are 41 refineries in California and are tabulated in Table III.B.5.b-1. Refineries in the San Francisco Bay area and near Santa Maria are shown in Visual No. 2. Crude oil for these refineries is obtained from foreign imports and domestic supply. Foreign crude oil imports are shipped mostly from southeast Asia (75 percent) and the Middle East. Generally, for large crude tankers that cannot make port, a crude oil lightering operation is conducted where barges shuttle crude

TABLE III.B.5.b-1

REFINERIES IN CALIFORNIA

Company and Location ^a	Capacity ^a Barrels Per Calendar Day	Gravity ^b Required (API)	Sulfur ^b Limit (% weight)
San Francisco Bay Area			
(1) Chevron USA-Richmond	365,000	Any	Any
(2) Exxon Co.-Benicia	99,000	13-40	1.5
(3) Pacific Refining Co.-Hercules	85,000	54	0.2
(4) Shell Oil Co.-Martinez	104,000	--	--
(5) Tosco Corp.-Martinez	137,000	Any	1.8
(6) Union Oil Co. of California-Rodeo	111,000	13-36	2.0
Near Santa Maria			
(7) Douglas Oil Corp.-Santa Maria	9,500	10-12	5.0
(8) Union Oil Co.-Arroyo Grande ^c	41,000 ^d	12-24	5.0
Los Angeles Basin	1,302,720	Varies	Varies
San Joaquin Valley	159,300	Varies	Varies
At Newhall, Oxnard, Ventura	40,100	Varies	Varies
Total for California	2,453,620		

^aOil and Gas Journal. March 26, 1979. Annual Refining Report.

^bThe Western Division Naval Facilities Engineering Command. June 19, 1976. Environmental Impact Assessments of Alternative Means for Transporting Crude Oil from Naval Petroleum Reserve No. 1, Elk Hills, Topman, California to Marketing Terminal.

^cDepartment of Energy. January 1, 1978. Energy Data Report, Petroleum Refineries Annual.

^d41,000 is included with Union at Rodeo.

() See Visual No. 2 for refinery location - denoted by number in parenthesis.

oil from the large tankers to shore. Domestic crude oil supply is obtained from Alaska, Four Corners, and California.

c. Oil and Gas Infrastructure: The refinery capacity in California, as reported in the March 26, 1979 Oil and Gas Journal, is tabulated in Table III.B.5.b-1. This report indicates a total of 41 refineries in California with a total refining capacity of 2,453,620 barrels per calendar day (bcd). In the San Francisco Bay area, there are six refineries with a total capacity of 901,000 bcd which represents about 37 percent of the total California capacity. In the Los Angeles Basin, there are 18 refineries with a total capacity of 1,302,720 bcd which represents approximately 53 percent of total California capacity.

According to the Department of Energy Report (Energy Data Report, Petroleum Statement December 1978) for the month of December, the California refineries received 47,687,000 barrels of domestic crude oil and 11,103,000 barrels of foreign crude. Of the domestic crude, 26,230,000 barrels were intrastate and 21,547,000 barrels, interstate. The foreign receipt in California represents about 5.4 percent of total foreign import to the United States.

d. Other: A 1977 Winzler and Kelly Study, A Summary of the Central and Northern California Coastal Zone and Offshore Areas, reports that municipal wastewater treatment plants treat domestic and industrial wastes and dump the effluent into streams, bays, and the ocean. Between Point Conception and California-Oregon Border, there are approximately 13 municipal plants that discharge the effluent into the ocean. Four of the larger plants are: San Francisco at 21.8 million gallons per day (mgd), North County Sanitation District at 6.0 mgd, Santa Cruz at 5.89 mgd, and Pacifica at 3.14 mgd. Total effluent discharge for the remaining 9 outfalls is 3.41 mgd. The proposed City and County of San Francisco's Southwest Ocean Outfall is designed for a total outfall of 670 mgd.

There are 19 public airports illustrated in Visual No. 2 and tabulated in Visual No. 2 Table 3. These airports are located near the proposed tract areas and have helicopter landing facilities. During exploration and development of offshore oil and gas, helicopters would be used to transport passengers and equipment to the drilling vessels, pipe lay barges, and platforms.

The American Telephone and Telegraph Company (J. A. Bourn, Plant Manager, 1978) has communication cables lying on the ocean floor, extending from Point Arena and San Luis Obispo. These cables are shown in Visual No. 2 and do cross the proposed Sale No. 53 leases.

The highways are shown in Visual No. 2. State Highway 1 and U.S. 101 are the only main north-south coast highways between the California-Oregon border to Point Conception. State Highway 1 is a paved scenic roadway and, generally, follows the coastline. U.S. 101, which is

heavily travelled by passenger cars and trucks, consists of freeway and divided highway sections.

There are several State, U.S. and Interstate highways running east-west. State Highways 58, 166, and 299 connect U.S. 101 to Interstate 5. State Highway 20 and 128 ties State Highway 1 and U.S. 101. In the San Francisco Bay area, there are several State and Interstate highways. Interstate 80 connects San Francisco-Oakland to Sacramento and Interstate 580 ties Oakland to Interstate 5.

Railroads are shown in Visual No. 2. Passengers and freight are the main railroad traffics. The National Railroad Passengers Corporation (AMTRAK) services the passengers. AMTRAK has a regular train schedule between Los Angeles and Oakland. The Southern Pacific Railroad Company owns the most mileage between Point Conception and Point Reyes. Santa Fe and Western Pacific have tracks running east from Oakland. Northwestern Pacific has lines in Marin and other northern counties. The Santa Maria Valley Railroad Company services the Santa Maria Valley and connects with the Southern Pacific mainline at Guadalupe. The California Western railroad runs east from Fort Bragg. The Arcata and Mad River railroad services the Humboldt Bay area.

Thirteen electric power plants are located near the coast between Point Conception and the California-Oregon Border. These power plants are shown in Visual No. 2. PG&E owns 12 of these power plants. The Georgia Pacific Corporation owns the SAMOA power plant, which is located above the Humboldt Bay. The Moss Landing electric power plant is the largest in megawatt capacity of thirteen plants. The Diablo Canyon, a nuclear power plant, was completed and ready for operation on September 26, 1977. This nuclear power plant still requires approval for operation.

6. Military Use: As illustrated on Visual No. 1, most of the OCS area off the California coastline is used by the military for one type of activity or another as described in the Third Fleet OPAREA MANUAL (COMTHIRDFLT INST 3120.1J). There are 4 areas of coincidence with the projected OCS Sale No. 53.

Portions of Bodega area Tracts 63, 65, 66, 68 and all of 67, overlay the submarine transit lane SIERRA DENEK and also lie within the extreme eastern boundary of range area November 3.

Portions of Santa Cruz area Tracts 79, 82 and 83 and all of Tracts 69, 70, 73, 74, 77, and 78 are coincident with Submarine Diving Area U1.

Portions of Santa Cruz area Tracts 96, 100, 105, 109, 116 and 119, and all of Tracts 104, 108, 114 and 115, are coincident with Submarine Diving Area U5. The Navy has agreed to joint usage of the above areas provided that Stipulations 1 and 2, as presented in Section I.B.6 are included as part of the sale requirements.

The majority of the Santa Maria area Tracts (129 through 243) lie under the general umbrella of activities scheduled by the Western Space and Missile Center located at Vandenberg AFB and the Pacific Missile Test Center located at Point Mugu. The nature and extent of these activities have been analyzed in depth during previous OCS oil and gas sales and joint usage has been agreed to with the agreement that Stipulations 1 and 2 as presented in Section I.B.6 are included as part of the sale requirements.

There are no problems with joint usage of any tracts underlying Air Force operating areas providing Stipulations 1 and 2 are required of any lessee.

7. Cultural Resources: Cultural resources are prehistoric and historic remains comprising a non-renewable resource base that provides anthropologists and historians with information for reconstruction of past cultural systems and behaviors. Cultural resource management by individuals, institutions, and governmental agencies involves the identification of these resources, their protection, and preservation for maximum longevity (Lipe 1977). In addition to traditional cultural (i.e., archaeological) resource concerns, religious and other cultural elements of concerned ethnic minorities are addressed in this document.

The preparation of the sections of this EIS dealing with cultural resources has taken place over the past several years and has involved a variety of research methods. The initial research was performed under BLM Contract (No. AA550-CT6-52) and resulted in the publication of an overview of cultural resources in central and northern California (Fredrickson, et al. 1977). Additional research, ethnological fieldwork, and consultation has been performed by in-house staff. Consultation has, in part, included the Advisory Council on Historic Preservation, California State Office of Historic Preservation, Native American Heritage Commission, and members of the Native American community.

Early Man in California. The initial migration of early people from the Old World across the Bering land bridge, "Beringea", to the New World occurred 25,000 to 100,000 years before present (B.P.) (see Figure III.B.7.b-1). Beringea provided a broad tundra and grassland access for many species, including Homo sapiens, to enter North America. Beringea had a periodic existence that was several times interrupted by rising sea levels (marine transgressions). Once across Beringea, southerly migration was possible only intermittently because of ice barriers across Canada during glaciation. According to Stewart (1973), the most likely times for man's descent into what is now the United States was when land corridors opened through the ice east of the Rocky Mountains approximately 14,000-10,000 B.P., 28,000-23,000 B.P., and 50,000 B.P. In contrast, MacNeish (1976) has estimated man's entry into the New World at 70,000 B.P. \pm 30,000. If initial human occupation was earlier than 50,000 B.P., a migratory route down the now submerged paleo-coast of the Pacific may have occurred.

Stickel (1978) has provided a summary of early California prehistoric finds and dates. Radiocarbon dates of >37,000 B.P. and >40,000 B.P. have been proposed for human occupation of the Santa Barbara Channel Islands. These dates, however, provide us only with indirect evidence of early human occupation because the material dated (charcoal, mammoth bones) was associated with human remains. A direct radiocarbon date of 17,150 B.C. \pm 1470 has been proposed for skeletal material (cranium and tibia) found in 1933 in Laguna Beach (Stewart 1969). A skull found in 1936, "Los Angeles Man", has yielded a radiocarbon data of >23,600 B.P. A human cranium found at Del Mar in 1929 has been dated at 48,000 B.P.

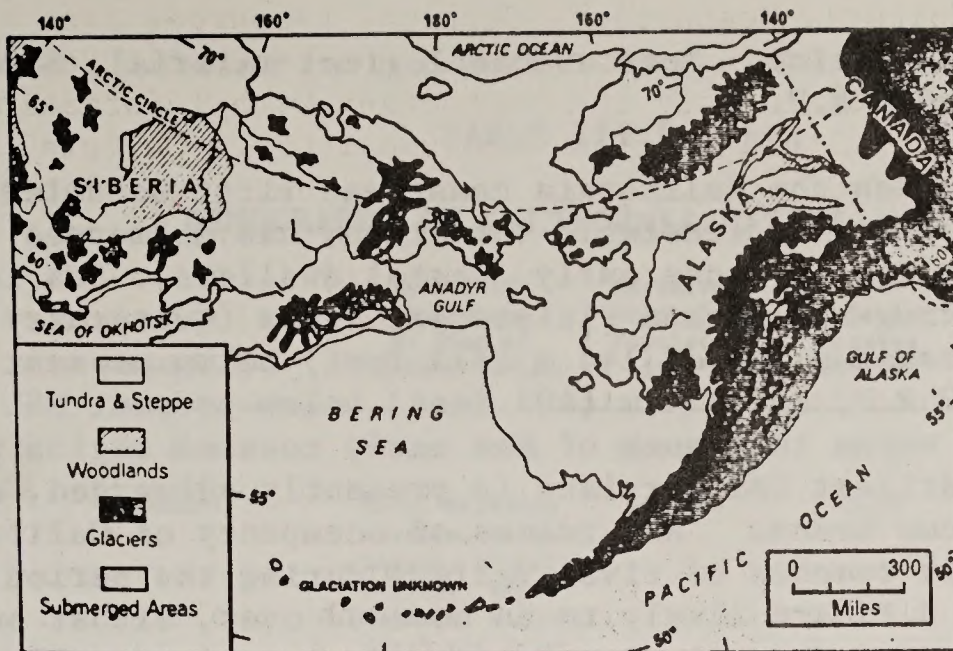


Figure III.B.7.b-1 Geography of Beringia During the Height of the Wisconsin or Wurm Glaciation. Source: Stewart, after Hopkins.

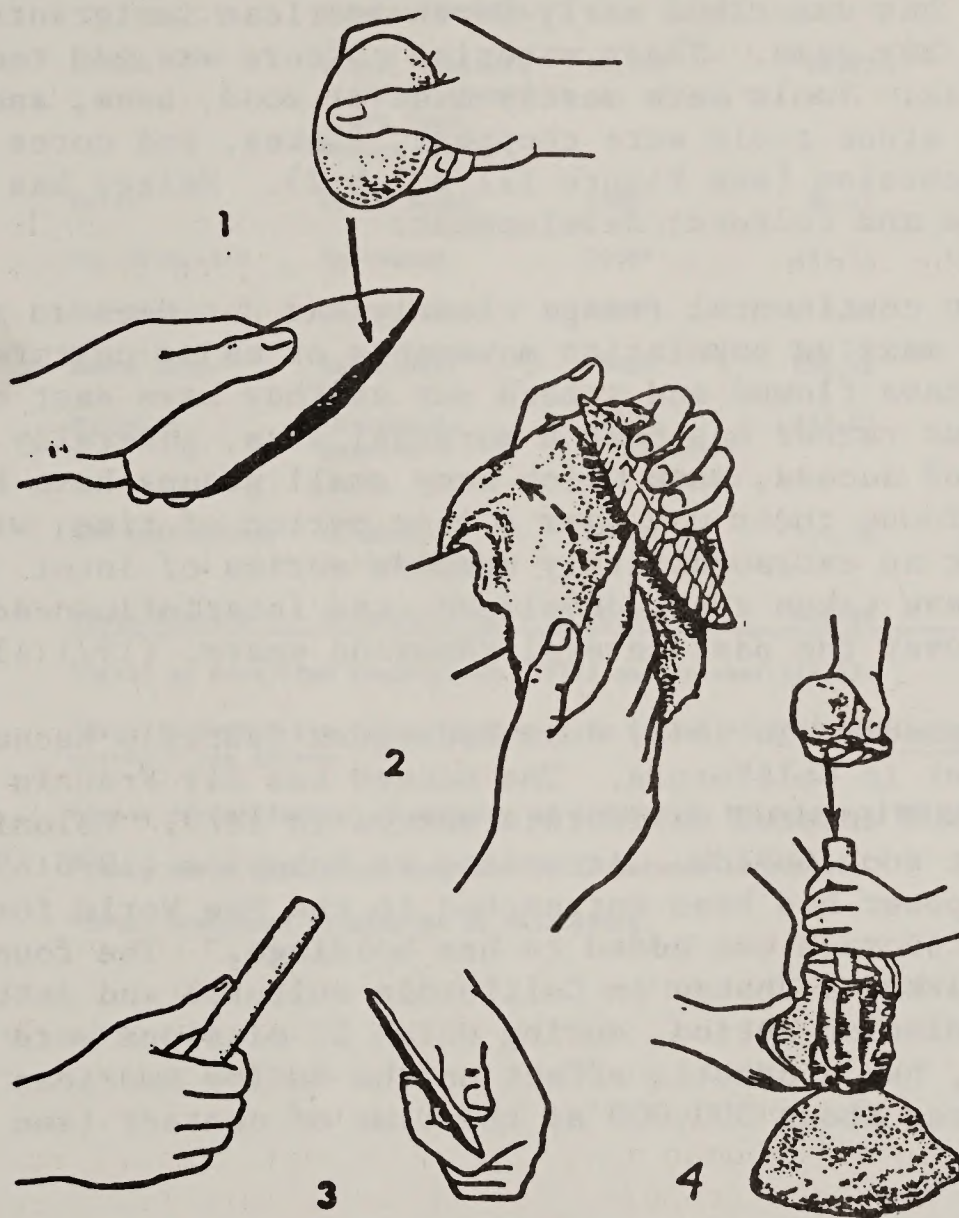


Figure III.B.7.b-2 Lithic Technology of Early North American Immigrants. 1. direct percussion flaking with a hammerstone. 2. pressure flaking: the hand which holds the tool, protected by a piece of leather, is held against the left knee, the right knee pushing the hand which holds the retoucher. 3. direct percussion with a soft hammer (wood, bone). The angle under which the flint is struck is very different. 4. indirect percussion (punch technique) for obtaining blades. Source: Bordes

by amino acid racemization. Most archaeological material, however, has been dated at <10,000 B.P.

It is not certain when the California coast was first occupied because worldwide rising sea level (eustatic variation) has submerged the archaeological remains of those early coastal dwellers. Sea level has varied greatly during recent and Pleistocene times (Quaternary). Sea level may have reached a low of 144 m (472 feet) below present mean sea level (MSL) 40,000 B.P. and 124 m (407 feet) below present MSL 18,600 B.P. This means that much of the early coastal region probably occupied by the earliest Californians is presently submerged, and at great depths in some areas. "Any traces of occupancy of California's coast and the lower reaches of river valleys during the period before 8000 B.P. to 7000 B.P. are likely to be covered over, either on the submerged shelf...or under alluvium deposited when river valleys were drowned by the rising ocean" (Bickle 1978:9).

MacNeish (1976) has described early North American immigrants as "collectors" of big game. Their material culture was not technologically complex. Tools were mostly made of wood, bone, and stone. The most common stone tools were choppers, flakes, and cores manufactured by percussion (see Figure III.B.7.b-2). Heizer has described early population and cultural development:

The western continental fringe clearly has not been an area into which massive population movements or major cultural complexes have flowed and spread out as they have east of the Rockies, but rather has been a marginal area, generally difficult of access, into which many small groups have been pushed or found their way over a long period of time, with the result that an extraordinarily complex series of local cultures have taken root, developed, and interinfluenced their neighbors over the past several thousand years. (1971:131)

Historic Development. In 1542, Juan Rodriguez Cabrillo became the first European explorer in California. The second was Sir Francis Drake, whose GOLDEN HINDE entered California waters in 1579. Colonization, however, did not soon follow. According to Schuyler (1978:69), "Spain as an imperial power had been entrenched in the New World for over 250 years before California was added to her holdings." The founding of San Diego in 1769 marked a change in California cultural and settlement patterns. The Mission Period, during which 21 missions were founded by the Franciscans, had a drastic effect on the Native American population, which had numbered about 300,000 at the time of contact (see Table III.B.7.b-1.)

The main function of the mission was, of course, conversion of local Indian populations to the faith of the Spanish padres. In the course of such conversion, it was necessary to bring the native, either by force or enticement, from his village to within the sphere of influence of the mission and the mission

TABLE III.B.7.b-1

DEMOGRAPHY OF CALIFORNIA NATIVE AMERICANS

County	Aboriginal Residents at Time of Western Contact	Estimated Aboriginal Population Size ^a	Population Increase 1950-1960 ^b	1970 Native American Population ^c
Del Norte	Tolowa, Yurok	1000-2400	42.8%	727
Humboldt	Kato, Sinkyone, Mattole, Wailaki, Lassik, Mongati, Whilkut, Hupa, Chilula, Wiijot, Coast and River Yurok, Karok	20,000+	43.0%	3055
Mendocino	Yuki, Central Northern Pomo, Athabascan Kato	17,330+	—	1433 ^d
Sonoma	Wappo, Southern and Southwest-ern Pomo, Bodega Miwok	10,000	62.2%	1623
Marin	Coast Miwok	1500	86.6%	382
San Francisco	Costanoan	7000 ^e	222.7%	2900
San Mateo	Costanoan	7000 ^e	7.0%	1340
Santa Cruz	Costanoan	7000 ^e	570.6%	360
Monterey	Costanoan, Esselen	7000 ^e Costanoan, 500 Esselen	443.0%	1139
San Luis Obispo	Chumash, Salinian	3000+	345.5%	1218
Santa Barbara	Chumash	10,000	646.3%	1008

^aBased on data from Fredrickson (1977) and Kroeber (1925).

^bSuch increases are primarily due to an influx of individuals from out-of-state tribes.

^cState of California, Department of Industrial Relations (1965).

^dThere was a population decrease of 3% between 1950-1960.

^eTotal Costanoan population in California.

padres (Heizer and Almquist 1971:5).

Mexican colonists soon followed to Alta California to establish large ranches for which laborers were needed.

Since most of the Indians were taken into the missions, these early ranchers worked their properties with conscript labor. The hacienda-peon system of Mexico was, thus, imported to California. (Heizer and Almquist 1971:18)

Spanish control of California was lost in 1821 and California became a Mexican land. In 1833, the missions were secularized and much of their holdings were dispersed by land grants. Throughout the period of Spanish and Mexican rule the Native American population rapidly decreased as a result of war, disease, peonage, and slavery.

Russian fortunes rose and fell rapidly in California. Pursuing seals and sea otters from the Aleutians to Baja California, Russian interests moved further southward as the resources decreased. Arriving in what is now Sonoma County in 1812, the Russians established Fort Ross as a hunting base and an agricultural supply station for their Alaskan colonists. Fort Ross was sold to an American, John Sutter, in 1841.

The discovery of gold in 1848 resulted not only in the "Forty-Niner" movement, but marked the beginning of a mass westerly movement to the "Golden State" that continues today.

Mexican rule had ended in 1846, but mistreatment of the Native Americans did not. By this time, the original population had been decreased by two-thirds to 100,000. By 1870 this number had been further reduced to an estimated 58,000^a.

Along with the migration of Americans to California came immigrants from Asia and Europe. Some of the groups well represented in California development include the Chinese, Japanese, Filipino, Irish, Finns, Swiss, Scots, Yugoslavians, Italians, and Germans. Much acculturation has occurred between Native Americans, early immigrants, and later groups. Nevertheless, there remain a number of groups today that continue to maintain distinctive ethnic identities and socio-economic ties within their communities, e.g., the Genovese and the Scots-Irish of Santa Cruz.

Terrestrial Cultural Resources. The coastal lands contain numerous archaeological sites (see Table III.B.7.b-2), most of which represent Native American resources. The heavier concentration of sites recorded in some counties is partially a reflection of large indigenous populations (e.g., Santa Barbara County), and partially the result of intensive surveying. Other areas northward (e.g., Mendocino County) have not been as intensively surveyed as others.

^aSee Heizer and Almquist (1971) for a thorough discussion of the treatment of minorities in California history.

TABLE III.B.7.b-2

CULTURAL RESOURCE SITES

County	Sites on the National Register of Historic Places ^a	Historic Sites ^b	Archaeological Sites ^b
Del Norte	6	16	53
Humboldt	11	183	339
Mendocino	1	35	112
Sonoma	28	34	959
Marin	15	78	456
San Francisco	64	141	26
San Mateo	21	75	152
Santa Cruz	2	110	134
Monterey	23	65	673
San Luis Obispo	8	69	725
Santa Barbara	12	72	1,353

^aCurrent listing as of February 6, 1979 and March 18, 1980.

^bSource: Fredrickson 1977.

In recent years, there has been an increased interest in historical archaeology (e.g., the recent excavation at Mission San Juan Capistrano). California's long history has provided a wealth of archaeological material, much of which is now being protected and preserved for the future.

Contemporary Native Americans. There are presently about 15-20,000 Native American residents in the central and northern coastal counties, although many are from other areas and states (see Table III.B.7.b-1). However, many of the Native American residents who are descended from local indigenous peoples continue many traditional beliefs and practices.

Subsistence gathering continues today both inland and on the coast. The intertidal zone is especially important to coastal dwellers. Although not well documented, family-gathered foodstuffs account for up to 25 percent of total subsistence for some Native American families (Roy, field notes 1979; Fredrickson, personal communication 1979). Traditional medicines, herbs, and teas are also gathered. Subsistence gathering has been identified by BLM primarily along the central coast between Bodega Bay and Fort Bragg, although it may be more extensive than is presently known in other areas.

Gathering for ceremonial purposes is primarily documented by BLM and others in Del Norte and Humboldt counties and the Point Conception area.

Both subsistence and ceremonial gathering has been reduced in recent years because of a decrease in the supply of traditional plant and animal foods and a lack of access to traditional gathering sites, many of which are now privately owned. Although the intertidal zone is controlled by the State, beach access in many areas is restricted by private property owners. Some of the traditional dances (e.g., White Deerskin) are now held every other year, instead of annually as in the past, due to current insufficient supply of the traditional foods that are served as part of the dance ceremonies.

There are numerous geographic landmarks and areas that are of special concern to indigenous groups because of what would be termed by western thought as their "sacred" nature. However, the traditional Native American world view does not divide the world into things that are religious or non-religious, sacred or non-sacred. Rather, the world is seen as an integrated whole, and everything that exists is part of the nature of all else.

The "religious" aspects of the lives of Native Americans can be only roughly categorized into separate considerations. Because of the particular nature of the Indian perceptual experience, as opposed to the particular nature of the predominant non-Indian, Western perceptual experience, any division into "religious" or "sacred" is in reality an exercise which forces

Indian concepts into non-Indian categories, and distorts the original conceptualization in the process. (Theodoratus, Chartkoff, and Chartkoff 1979:44)

Some of the landmarks^a of concern to contemporary Native Americans are important because they were traditionally used by their ancestors. Many of these places are still being used in traditional ways. In addition, there has been a resurgence of interest in indigenous practices and beliefs that has resulted in a syncretic religious movement involving both young and old. The result is that some traditional ways have been adopted not only by those individuals for whom these beliefs and practices were part of the cultural experience they have known from childhood, but by those for whom this has not been the case.

Offshore Cultural Resources. The offshore region of California is apparently rich in cultural resources. Types of submerged resources are aboriginal remains, and sunken ships and aircraft. The fields of prehistoric and historic marine archaeology in this region have begun to develop only recently. Thus far, most marine prehistoric work has occurred in southern California in San Diego and in the Santa Barbara Channel area. This does not necessarily reflect a lack of resources along the central and northern coast, only a lack of investigation in those areas. Hudson (1976) has provided a recent comprehensive review of previous investigations of submerged aboriginal remains along the southern coast. A major importance of these resources is their potential contribution to anthropological knowledge and theory about man's beginnings in the New World. There is a relatively good chance for preservation of large quantities of submerged prehistoric resources.^b

Shipwrecks are important because they capture an instant in the life of a culture and preserve it fairly intact. On board a ship are nearly all the necessities and many of the amenities of contemporary life. Tools for carpentry, sailmaking, shoe repair, cooking, and eating were often present, as well as cargo and personal items of passengers and crew. Due to long lengths of time away from ports, much had to be carried along to maintain the vessel and personnel. Sinking was generally in the violent circumstances of war, storm, or sudden encounter with unseen reefs or rocks, none of which usually provided ample warning or opportunity to salvage. Materials recently salvaged from old wrecks include such small and perishable items as fabrics, spools of ribbon, hats, shoes, foodstuffs, awls, and needles. Increasing numbers of shipwreck artifacts have been recovered offshore California in recent years. An in-house study was conducted by BLM in 1979 to compile and organize

^aNo attempt has been made to list significant landmarks or gathering sites in order to protect the sites and the individuals presently using them. Although BLM is aware of the locations of some of these sites, there are probably many more undocumented.

^bBLM has funded a pilot study on preservation potential based on geologic and ocean processes of cultural resources on the OCS. Preliminary results should be completed in 1981.

available shipwreck data. This study identified 1276 vessels of historic interest that were reported lost along the central and northern coast of California. Of these wrecks, 145 were reported grounded and the remainder reported lost offshore. Most of the offshore losses have been reported in State, rather than Federal, waters. Though the locations of historic shipwrecks have been in some cases precisely noted, they are often far, perhaps many miles from the location of their reported loss. Location errors have occurred because of navigational error, loss report error, or because of vessel drift. It is not uncommon for an abandoned damaged ship to drift for a long distance prior to eventual sinking. For these reasons, it is very likely many of the shipwrecks reported in State waters actually occurred in Federal waters.

8. Visual Resource Values: For the most part, the California coastline is an outstanding visual resource of great variety, grandeur, contrast, and beauty. Visual attractions such as the dramatic meeting of land and water, clear skies, unspoiled natural areas filled with wildlife, and the rich texture of urban shorelines add to the quality of life for coastal residents, visitors, and workers; and contribute to the economic success of the tourist industry by attracting many vacationers to the coastline.

The systematic analysis of scenic quality is a complex and difficult task because of the great variety of natural and man-made conditions along the California Coast. BLM has developed a rating system that attempts to objectively rate on a regional scale the visual quality of various landscapes (see BLM Manual, Section 8411 for details). The system classifies the landscape into degrees of scenic quality to separate the most important areas from those of lesser value. The final rating depends upon the basic elements of form, line, color, and texture. Landscape form is most strongly expressed in the shape of the land surface. Colors in the landscape are usually most prominent in vegetation, but are frequently expressed in soil, rocks, water, etc. Texture is a result of the size, shape and placement of parts, their uniformity and the distance from the observer. Vegetation and erosive patterns usually produce landscape texture. The foregoing factors form an image which may be perceived to have a sense of unity and harmony, or "beauty" or it may exhibit disorder or "ugliness". Views of the natural environment usually exhibit unity and harmony. Man's effects on the visual resource are characterized as "intrusions" which may have a positive or negative impact. Intrusions which do not relate well with their surroundings because of a lack of unity among design elements or because of the interjection of incongruous elements, are "ugly" or negative. Visual No. 6 rates, on a general or regional scale, the visual quality of the coastline based upon the factors discussed above.

Class A scenery is the highest class and is represented by spectacular views free of negative intrusions. Class B is of lesser quality than Class A because of inherent shortcomings as compared to Class A or it is otherwise Class A scenery downgraded by the presence of some inharmonious intrusions. Class C is ordinary, common for the region scenery, or affected with numerous negative intrusions.

C. Distinguishing Subregional Environmental Characteristics

For a comparison of differences in potential subregional impacts see Section II.B. Alternatives one through five discuss the differences in these potential impacts for each of the five basins.

D. Future Environment Without the Proposal

1. Expected Change in the Natural Environment

a. Air Quality: Under the Clean Air Act Amendments of 1977, regions that currently exceed the Federal air quality standards must prepare a plan to meet that standard and to maintain compliance with this standard in the future. These plans must show how standards are to be met by 1982, using a combination of stationary source, mobile source, and transportation controls. The attainment date for meeting the standards for carbon monoxide and oxidant can be extended to 1987 if attainment in 1982 is impossible, even after the application of all reasonably available control measures. Thus, based upon legally enforceable air pollution control plans and existing air quality regulations, the entire study area should meet the air quality standards by 1987. However, some recent data have made this attainment date less certain. Periodic measurements of vehicular pollutant emissions have shown that the effectiveness of automotive pollution control devices decreases with use more than originally anticipated. Part of the problem may be due to consumers destroying anti-pollution devices by using leaded gasoline in cars equipped with catalytic converters, owing to the high cost of unleaded gasoline or its unavailability. The end result may be to hamper efforts toward meeting the air quality standards in regions of heavy automobile use such as Los Angeles and the San Francisco Bay area. Conversely, lack of adequate gasoline supplies and fuel conservation efforts may reduce automobile use which would tend to reduce regional vehicular emissions and, therefore, improve future air quality.

b. Important Marine and Coastal Habitats: With the inevitable population expansion and development along wetlands and the coast, some corresponding degradation to coastal habitats is expected. Although the rate of degradation will be decreased due to state and local commitments and legal mandates, the amount is unquantifiable and unpredictable except in general terms.

According to the oil spill model, the expected number of spills occurring in the central and northern California area, as a result of Sale No. 53, is increased by one. One spill is expected from tanker traffic even without a sale. The lessening of detrimental impacts as the result of having one fewer oil spill within 30 years is probably insignificant. The main exceptions may be to an estuary or wetland if a large spill were to enter it and remain for several days. Also, the loss of some endemic species in the Santa Maria area might be avoided.

The threat of an oil spill (see impact section) to marine mammals, seabirds and endangered species will still be present without the proposed Sale. The threat of an oil spill from tankers continues to exist, and the volume of oil tankering will probably increase without the proposed Sale. Anticipated overall impacts would, therefore, remain the same.

2. Expected Changes in the Human Environment

a. Commercial Fisheries: Commercial fishing will continue to be a mainstay of the local economies of central and northern California communities. The total pounds landed and their value will probably increase at all major ports. New fisheries will develop as competition for presently harvested stocks becomes more intense. Competition for limited salmon stocks will continue to be particularly high. Without the proposal, the potential of oil spills and their predicted impacts will be less but could still occur from tanker traffic. No significant losses due to offshore manmade structures would be likely but competition for onshore facilities would still exist with other users. Sewage discharges and vessel traffic will probably increase.

b. Recreation and Sportfishing: The expected change in recreational activities without the proposed sale would still be an increase in amount of participation and construction of facilities. This is due to more time being available to people for leisure activities. The restraints on this growth are available cash and availability of gasoline, and this would tend to have people utilize facilities closer to their towns than are presently used.

Tourism will continue to increase due also to the increase in available time and money; however, if there is a reduction in the available supply of gasoline, there is expected to be a drop in tourism in the affected area, as was seen in the 1974 and 1979 gasoline shortages.

Sportfishing is expected to continue following its past trend in participation, with a slight increase. The major restraint on continued growth is the problem of transportation to elected sites.

In all, recreation and sportfisheries will continue to grow in the absence of Sale No. 53, but will continue to risk impact from sources such as municipal sewage, regulated access, and rising costs.

c. Socio-Economic Development: Without proposed Sale No. 53 there would still be, in most instances, a general expansion of existing population and economic bases in most central and northern California coastal areas. The Harris Model has been used to project and quantify the extent of change. (The Harris Model is discussed in Section IV.A.6 and in POCS Reference Paper No. 53-3.) The following table, Table III.D.2.c-1, gives 1990 base period estimates, i.e., without proposed Sale No. 53.

The Harris Model is the most detailed of the existing economic models and, as such, requires a very large data base. To estimate the parameters of the equations used in the model, hundreds of data items have been collected for all 3,100+ counties in the United States. Much of the data used in the model is that which is reported to and compiled by the Department of Commerce (particularly the Bureaus of Economic Analysis and the Census). Generally, the projections for these California counties are consistent with other local and State projections. However, there are anomalous 1990 population projections for some counties (showing less in 1990 than current estimates of county populations). The population data base used in the Harris model will be updated when 1980 census data is available.

TABLE III.D.2.c-1

PROJECTED POPULATION AND ECONOMIC BASE
IN 1990 WITHOUT SALE NO. 53
(\$ Millions)^a

County	Population	Employment	Personal Income	Private Investment	Value Added	State & Local Gov't. Purchases
Alameda	1,525,741	618,818	\$10,837	\$ 1,524	\$ 11,506	\$ 2,455
Contra Costa	813,813	393,336	6,111	932	6,469	1,284
Del Norte	17,062	8,111	134	15	176	34
Humboldt	74,617	30,257	575	67	520	155
Marin	217,735	126,686	1,702	236	1,503	369
Mendocino	45,048	15,559	273	46	302	101
Monterey	276,602	87,436	2,045	307	1,505	349
Napa	106,822	33,344	513	110	631	189
San Francisco	721,082	422,032	8,445	1,637	15,713	1,316
San Luis Obispo	115,164	50,315	766	94	514	254
San Mateo	699,976	413,141	6,372	938	8,987	1,009
Santa Barbara	350,474	158,534	2,628	453	2,677	416
Santa Clara	1,775,016	888,117	13,919	3,520	21,134	2,190
Santa Cruz	112,483	40,246	688	110	505	160
Solano	199,421	53,111	1,210	149	914	284
Sonoma	201,037	87,744	1,408	194	1,038	341
16 Coastal County Total ^b	7,252,092	3,426,786	\$ 57,626	\$10,330	\$ 74,093	\$10,907
California Totals	26,132,263	11,689,888	\$192,777	\$32,865	\$239,464	\$37,227

^aIn constant 1972 dollars.^bFigures may not total due to rounding.

d. Coastal Land Use: In this discussion about future land use available, Local Coastal Program (LCP) documents and the California Coastal Plan (1975) were used as basic sources. It is important to realize that: 1) future land use will be determined by the local jurisdictions once their LCP has been certified, and 2) that while land use intent can be determined from the LCP's they can be amended to accommodate other land uses not initially permitted.

i. North Coast Del Norte, Humboldt, and Mendocino Counties: The general concerns identified (see Section III.B.4 and IV.B.7) indicate that maintenance and rehabilitation of timberlands will be undertaken, as well as the minimization of conversion of timberland to other uses. The Coastal Act (1976) contains a specific policy protecting against the conversion of prime agricultural land which is in production, to non-agricultural uses (Section 30242). Other agricultural lands near developed areas may be designated as open space visual resource areas. Recreational use of special marine resources in the area, such as offshore rocks, sand dunes, beaches, wetlands, streams, and rivers in the coastal zone is likely to be regulated to protect the habitat areas (Section 30230). Other recreational uses are likely to be expanded, especially trail and bikeway systems. In view of the Coastal Act policy to concentrate development [Section 30250(a)], land subdivisions outside of urban areas are likely to be limited. Industrial development will be given a preference for locating in areas already designated as industrial (Section 30260), which would generally result in industrial concentration in the Eureka-Humboldt area. To retain the tourist attraction of this area, which is somewhat of a New England village character, any new development would probably be required to be consistent with the prevailing architectural style. Major restraints to any development would be the following considerations: sewage capacity, water supply, the carrying capacity of existing roads, and the protection of Highway 1 as a scenic road in rural areas.

ii. North Central Coast - Sonoma, Marin, and San Francisco Counties: In Sonoma County, future development potential will be limited by the lack of basic services in most areas: water, waste disposal, emergency and educational services, road capacity, and public accessibility. Development at the Sea Ranch will be limited to a level consistent with transportation capacity and increased public access to the public tidelands. The grazing land, from south of Sea Ranch to the mouth of the Russian River, will most likely be retained in open space, with increased parklands and trail systems for public access. Development in the Russian River floodplain will be consistent with safety standards for flood prone areas. South of the Russian River, the State Park lands may be expected to expand while limiting subdivision growth for visual resource management. The Bodega Bay area will probably experience some expansion and development. However, the Coastal Plan (1975) noted the need for protection of Bodega Head and the marshlands around the Bay, while providing expanded harbor facilities.

The Estero Americano and Estero De San Antonio, relatively undisturbed estuaries, will likely receive special protection, such as access limited to hikers only. Some expansion of recreational facilities and some development of the small towns around Tomales Bay is likely to occur. Because concern has been expressed to protect the many marshlands around Tomales Bay, development is expected to be limited to the village areas already developed. Agricultural uses will be encouraged to remain. The Coastal Act policies indicate a thrust toward balancing increased visitor recreation usage with protection of the resources, as noted above. The Point Reyes National Seashore is an area in which these policies apply. Much of the area south of Point Reyes to the south side of the Golden Gate is included in the Golden Gate National Recreation Area, and is also considered to be appropriate for low level public use because of the fragile natural settings. Bolinas and Stinson Beach communities will experience some growth, although it will likely be limited to infilling at rates continuing historic trends. The western coastline of San Francisco is nearly totally developed with mainly residential and recreational uses. Pressure on the housing market is expected to drive up the cost of coastal land, and design reviews may be imposed to ensure consistency with the California Coastal Management Plan. The Farallon Islands will remain in a wildlife refuge status. The Islands are also being considered for addition to the Registry of National Natural Landmarks.

iii. Central Coast - San Mateo, Santa Cruz, and Monterey Counties: San Mateo County, because of its accessibility, is popular both for its suburban residential communities and recreational uses. The pressure to develop is great, but the County has developed an urban infill strategy to alleviate the possibility of sprawl. The county seeks consolidation of urban development and high density development where public facilities and services will permit. At the same time, the county is discouraging infilling of urban areas on prime agricultural soils and sensitive habitats. The Half Moon Bay area, Daly City and Pacifica, all face possibly rapid and extensive growth. More extensive agricultural uses will be encouraged, as well as further development of the recreational resources of the beaches and Pillar Point Harbor. The Ano Nuevo coastline is primarily in agricultural use, with wildlife areas and significant recreational opportunities. Ano Nuevo Point and Island area also being considered as additions to the Registry of National Natural Landmarks. The Coastal Act expresses the intent to achieve a balance with public access and agricultural use. The small towns of Davenport and Pescadero do not have the capacity for expansion and are not projected to undergo further development. Development constraints may be the following considerations: physical constraints of steep slopes, seismic hazard areas, landslide hazards, Williamson Act protection of much of the agricultural lands, inaccessibility, and, water supplies which are adequate to meet existing demands but have little available surplus. While the county wants to protect, encourage, and, where feasible, to provide housing opportunities for low and moderate income housing, water supply and the

quality of that supply may be severe constraints to that goal.

Most of the Santa Cruz County area has become urbanized not only as a retirement community but also because of its accessibility to the Santa Clara Valley and as a community recreational focus for inland residents. Preservation of prime agricultural land, while expanding the community and recreational facilities are major land use issues in this area. The following are some of the concerns within the county: to maintain the semi-rural character of the area, the protection of scenic habitat and recreational values, improvement of access to coastal parklands (approximately 10 percent of the total coastal land area), traffic congestion problems, preservation of agriculture, water quality and quantity, and land use conflicts between preservationism and development. Within the City of Santa Cruz, demand for water will exceed available capacities by 1985; sewage capacities will be exceeded by 1985-90. The amount of available land zoned for industrial development is also very limited within the city. Both of these factors may pose severe development constraints within the city. The county is also currently implementing a growth management program that was mandated by public referendum.

The area adjacent to the central part of the Monterey Bay is one of the richest agricultural areas in California. The protection of the Elkhorn Slough and wetlands, and protection of agricultural lands against urban expansion are primary issues in the area. Access to the public beaches, along this part of the coastline, is likely to be improved in the future to accommodate increased recreational use. Expansion in Moss Landing, where there is currently a power plant and harbor facilities, will attempt to take wetland and agricultural protection into account, as well as sewage treatment limitations. Agriculture and fragile sand dunes predominate along the coastal area south of Moss Landing. Seawater intrusion is also a threat to agriculture, and any future solutions to present water limitations may have to address this problem as well.

The Monterey Peninsula contains many natural, plant communities, and several areas of historic significance that can be expected to come under special protection. However, development pressures from the growth of personnel at Fort Ord and the expanding tourist industry are resulting in urban expansion. The Big Sur Coast is a recreational area of national significance, visited by more than a million people per year. The scenic resources can be expected to be protected, while the Monterey County Plan allows for low density residential development. Other future concerns of Monterey County are: maintenance of the agricultural and rural lifestyles of the county; some industrial expansion at Castroville; preservation of open space around McClusky, Elkhorn, and Moro Cojo Sloughs; and improvement of recreational and visitor serving facilities. Sewage disposal and water supply will be the biggest constraints to any development with the county. Much of the area's water supply is totally derived from groundwater that is being depleted in many areas. Much of the wastewater is treated by septic

tanks and development will be constrained by the assimilation capacity of the soil unless other provisions for wastewater treatment are made. Two areas in Monterey County are also being considered for additions to the Registry of National Natural Landmarks: the Hopkins Marine Reserve and the Monterey Submarine Canyon Complex.

iv. South Central Coast - San Luis Obispo, and Santa Barbara Counties: In San Luis Obispo County, land use concerns will probably result in future land use policies as follows: increasing recreation and access opportunities, protecting and providing lower cost housing opportunities, preserving agricultural land, and considering natural hazards in new development. Agricultural uses will probably be preserved, as well as several special marine and estuarine areas. Highway 1 may not be expanded to any larger than its current two-lane rural status, but San Simeon Acres may provide expanded tourist facilities. The Estero and Morro Bay areas contain many different natural habitats. Development in the three communities in the area, Cayucos, Morro Bay, and Baywood Park will likely be contained in such a way as to provide some protection for those habitats. These communities have been expanding for retirement and tourist services. Some industrial development along the coastline within Morro Bay is anticipated. A major goal of the Coastal Act is the balancing of this type of development with protection of the marine resources. South of Morro Bay is Montana De Oro State Park and some inaccessible coastline. Montana De Oro-Point Bushon are also being considered as additions to the Registry of National Natural Landmarks. Diablo Canyon (also the site of the nuclear power plant) has experienced some development, but it is likely to be limited in the future. The major constraints to any new development are water and sewage deficiencies. The following communities are presently experiencing building moratoriums due to these constraints: Cambria, Morro Bay, and Nipomo. No short term solution is seen for Morro Bay. The following communities are experiencing diminished capacity in water and sewage supply: Cayucos, South Bay, and the Five Cities Area. Until these deficiencies are solved, little new development is seen for the above areas.

In Santa Barbara County, the land use concerns will probably result in the following policies: preservation of agricultural lands, minimization of urban pressure on agricultural or open space lands, firm urban-rural boundaries that will in effect redirect growth from outward expansion to infilling, expansion of public access opportunities, protection of environmentally sensitive areas, and architectural controls so that new development is subordinate to the environment. The Land Use Plan (LUP) for the county proposes a substantial increase in minimum parcel size requirements in the North Coast area to maintain agriculture viability. There is no planned urban development for the North Coast area. In the South Coast area, the LUP proposed to concentrate new development in and adjacent to Carpinteria. It is also anticipated that energy-related development will increase; the LUP seeks consolidation of facilities when feasible. At present the demand for

coastal recreational opportunities exceed the supply. This may result in a program of land acquisition and facility development in the future. The LUP makes ample provision for continued growth and development within the county through the year 2000, provided that sufficient water resources are available. The major constraints to any new development are water and sewage capacities which, in many communities, are at near capacity levels. All south county areas are experiencing some development constraints due to limited water resources.

e. Transportation Systems: The source of information for the transportation systems is from the Final Environmental Impact Statement for Sale No. 48, California Coastal Plan for 1975, and the references cited in Section III.B.3.c. Without the Proposal, there could be an increase in foreign and Alaskan tankers carrying crude oil and liquified natural gas (LNG), to the California Coast to replace the loss of potential Sale No. 53 crude oil and gas. There are several proposed projects that could affect shipping and port activities along the California Coast. The proposed Point Conception LNG project could result in LNG tankers from Alaska via the nationally recommended shipping lanes for tankers transmitting between the Gulf of Alaska and U.S. West Coast Ports. These shipping lanes are offshore of the proposed TSS as far south as Point Sur where the northbound lane crosses the TSS. Additional tankers would also come from Indonesia. The Space Transportation System at Vandenberg Air Force Base could use barges from the Gulf Coast which would sail offshore California to and from the Vandenberg Base.

Sale No. 48 crude oil in the Santa Barbara Channel and the Elk Hills crude oil from Port Heuneme could be tankered to the refineries in the San Francisco Bay area. The Alaskan tankers would transport crude from Valdez to San Francisco, Los Angeles, and the Gulf Coast via TSS, off the California coastline.

Humboldt Bay, Bodega Bay, Monterey Bay, and Santa Cruz Harbor would undergo limited expansion with emphasis on safety and balance between recreation and commercial activities. Estero Bay would expand the marine oil terminals to receive larger tankers. State Highway No. 1, the main coastal highway, would be developed to provide for safer driving and public recreation, but would not be developed for increased traffic.

f. Military Uses: As shown on Visual No. 1, most of the OCS area off the California coast is designated for some type of military training exercises or operations. The Department of Defense has determined that the tracts proposed for leasing by OCS Sale No. 53 would have no impact on military operations; therefore, whether the sale occurs or not will have no impact on the military operations.

g. Cultural Resources

i. Terrestrial: With increased residential and industrial development, the coastal lands will be more intensively surveyed for archaeological sites. As a result, more resources will be identified and archaeological data will increase. Although some mitigation will be undertaken in most cases, it is likely some damage and looting will occur. There will be continued deterioration with age of some historic landmarks, but the current interest in protection and preservation will positively affect an even greater number of these sites than at present. Coastal Native Americans will find subsistence and ceremonial gathering increasingly difficult as the supply of traditional foodstuffs decreases. Access to traditional gathering places will be variable.

ii. Offshore: Aboriginal artifacts, sites, and historic shipwrecks will be subject to continued artifact hunting by sports divers. Some submerged cultural resources will be destroyed or damaged by natural forces as they continue to lie on the bottom. However, those historical and prehistorical resources protected by sediments or in deep cool waters will continue to be preserved for a great many years.

IV. ENVIRONMENTAL CONSEQUENCES

Section IV discusses the environmental consequences that would result from the proposal. Three sections are included. Section A discusses particular impact agents that affect the resource categories. Section B discusses the probable impacts that would result from the proposed action. Section C summarizes the subregional impacts and the impacts of the No-Sale and the Delay the Sale Alternatives. Impacts from the other alternatives are discussed in Section II.B. Cumulative impact discussions are all based upon the activities described in Section III.B.3.b, unless otherwise noted.

A. Significant Impact Producing Agents

1. Oil Spills: The Department of the Interior Oil Spill Risk Analysis Model has been described (Lanfear, Smith and Slack 1979). Detailed model results can be obtained from the U.S. Geological Survey (Samuels and Lanfear 1979). In addition to these documents, a great deal of Outer Continental Shelf (OCS) related oil spill information related to oil and gas development offshore has been presented in the Environmental Impact Statement published for OCS Sale No. 48 (Bureau of Land Management 1979). The following data is provided as a synopsis of critical information.

Description of the Oil Spill Risk Analysis Model. The oil spill risk analysis model was developed by members of the U.S. Geological Survey located in Reston, Virginia. To determine potential targets, the area to be studied is plotted, using a digitizing process, on a 480 by 480 cell grid. Each cell within the grid represents an area of approximately one square mile in this application. The 12 representative oil spill launch areas (P1 through P12) selected for Sale No. 53 were then plotted as shown on Figure IV.A.1-1. Potential oil spill launch areas representative of existing development (E1 through E5) were also plotted as shown on Figure IV.A.1-2 for determining cumulative impacts. Potential transportation routes (both tanker and pipeline) were also plotted as shown on Figure IV.A.1-3.

To provide flexibility in analyzing shoreline impacts such as beaches, harbors, marinas, kelp beds, etc., the shoreline is divided into segments as shown on Figure IV.A.1-4. Each segment is approximately 27 miles long. Islands are represented in the same manner. Once a spill impacts a shoreline segment, a computer run is terminated. Potential resource categories to be evaluated that do not lie within a shoreline segment are plotted as shown in Figure IV.A.1-5. While analyzing the "at-sea" resource categories, an evaluator must remember that the relative size of the target area will affect the numerical results. For example, the area represented by the Guide Seamount on Figure IV.A.1-5

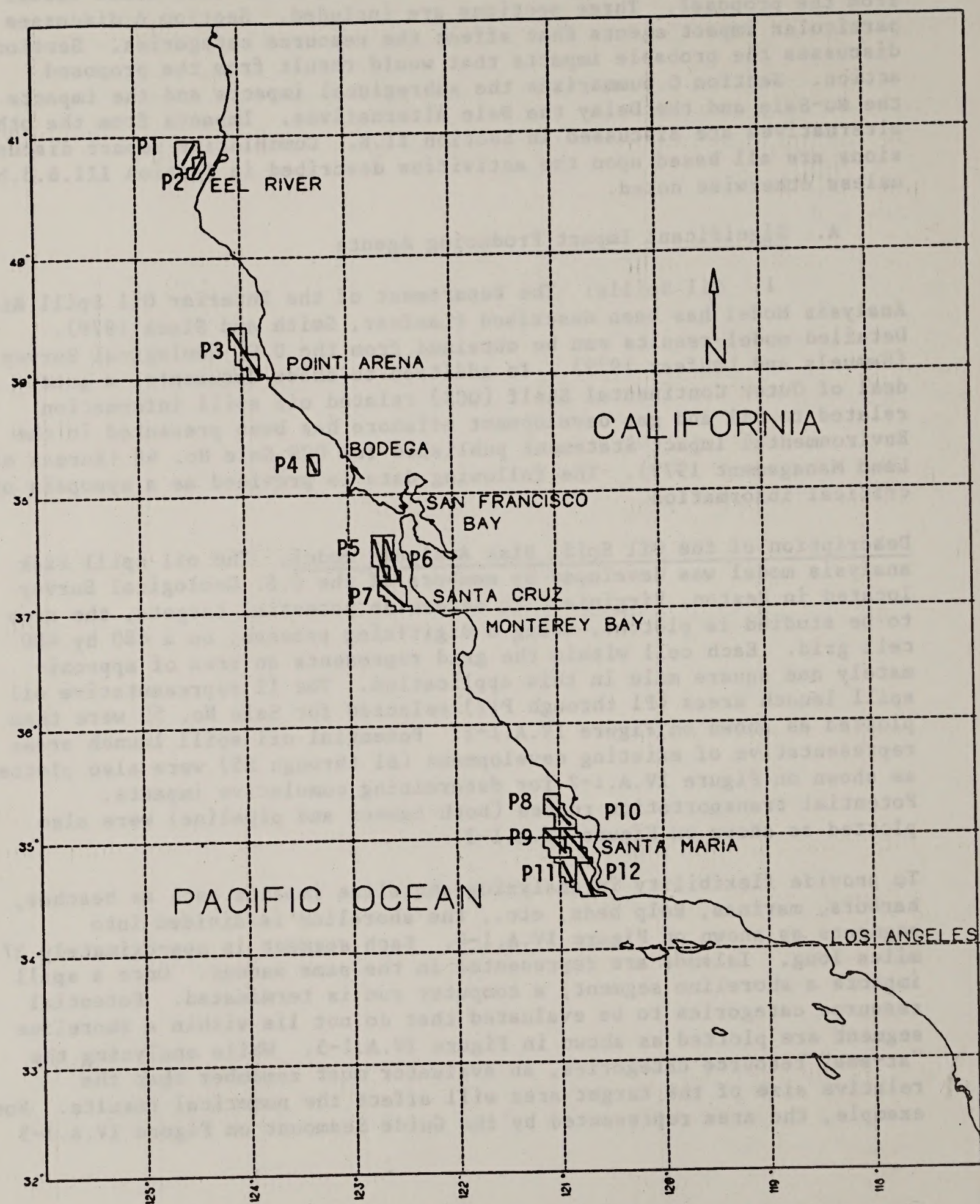


Figure IV.A.1-1 Map showing subdivisions of the proposed leases for Central and Northern California OCS Lease Sale 53.

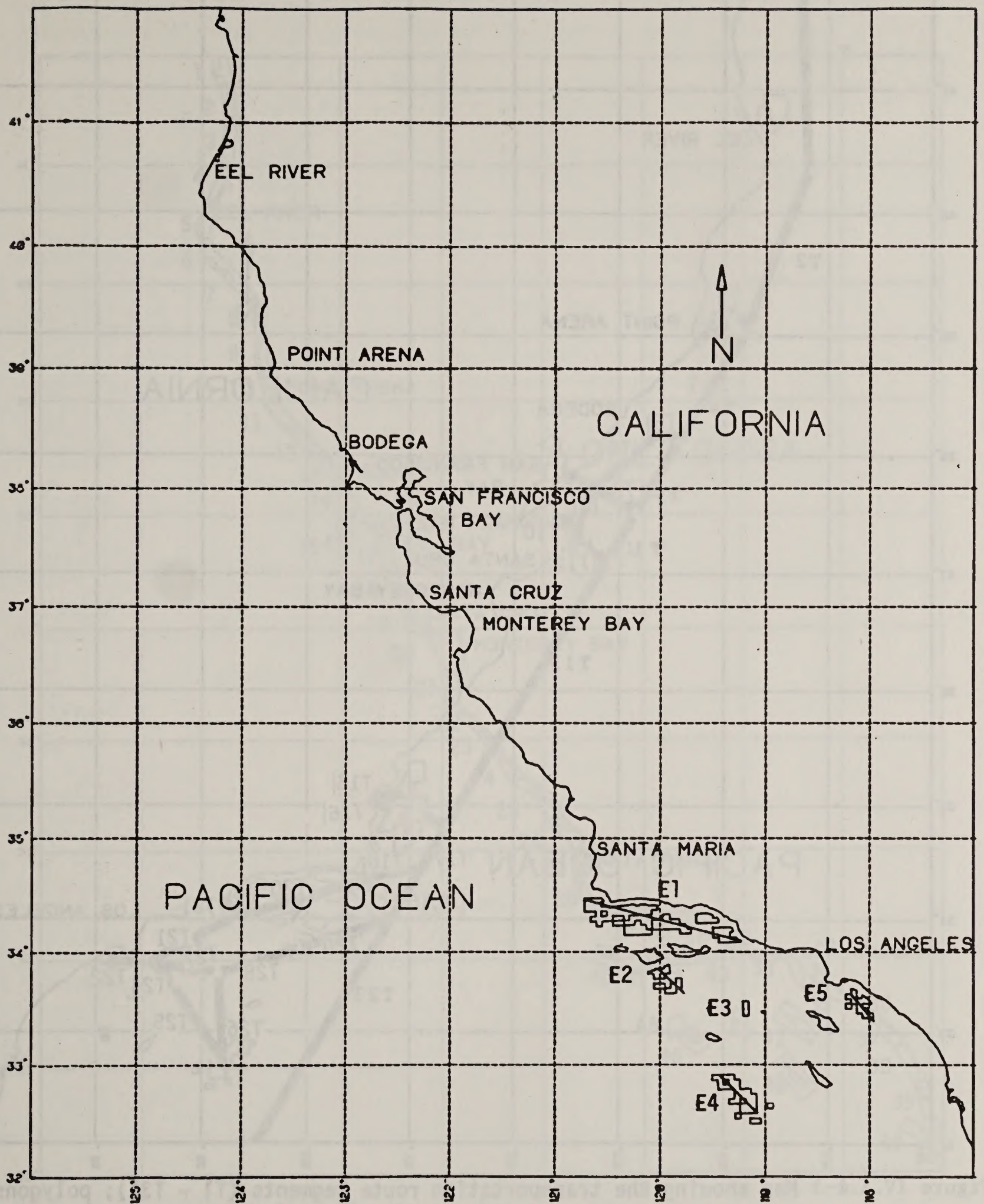


Figure IV.A.1-2 Map showing the subdivisions of the existing leases in the study area.

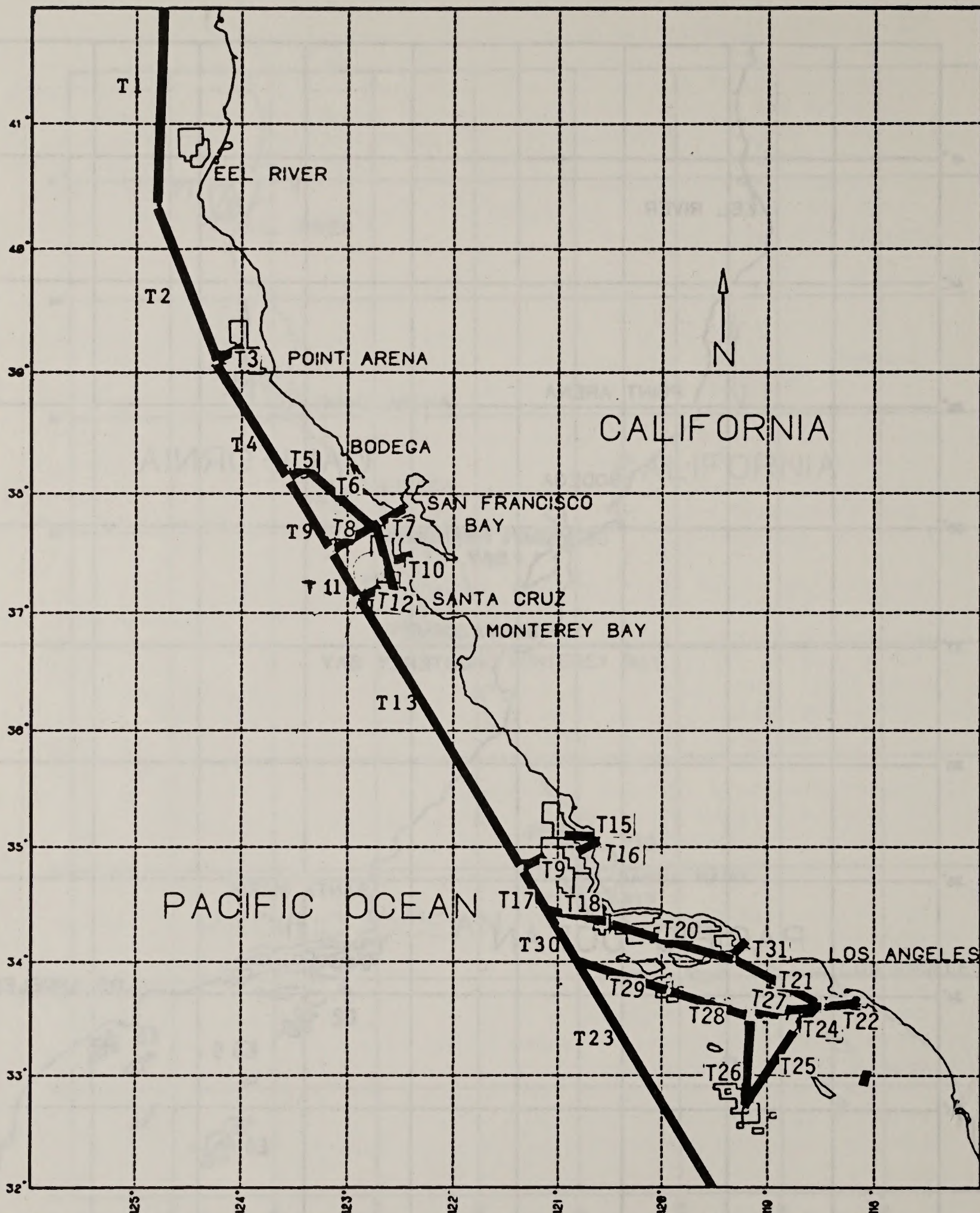


Figure IV.A.1-3 Map showing the transportation route segments (T1 - T31); polygons represent proposed and existing lease tracts.

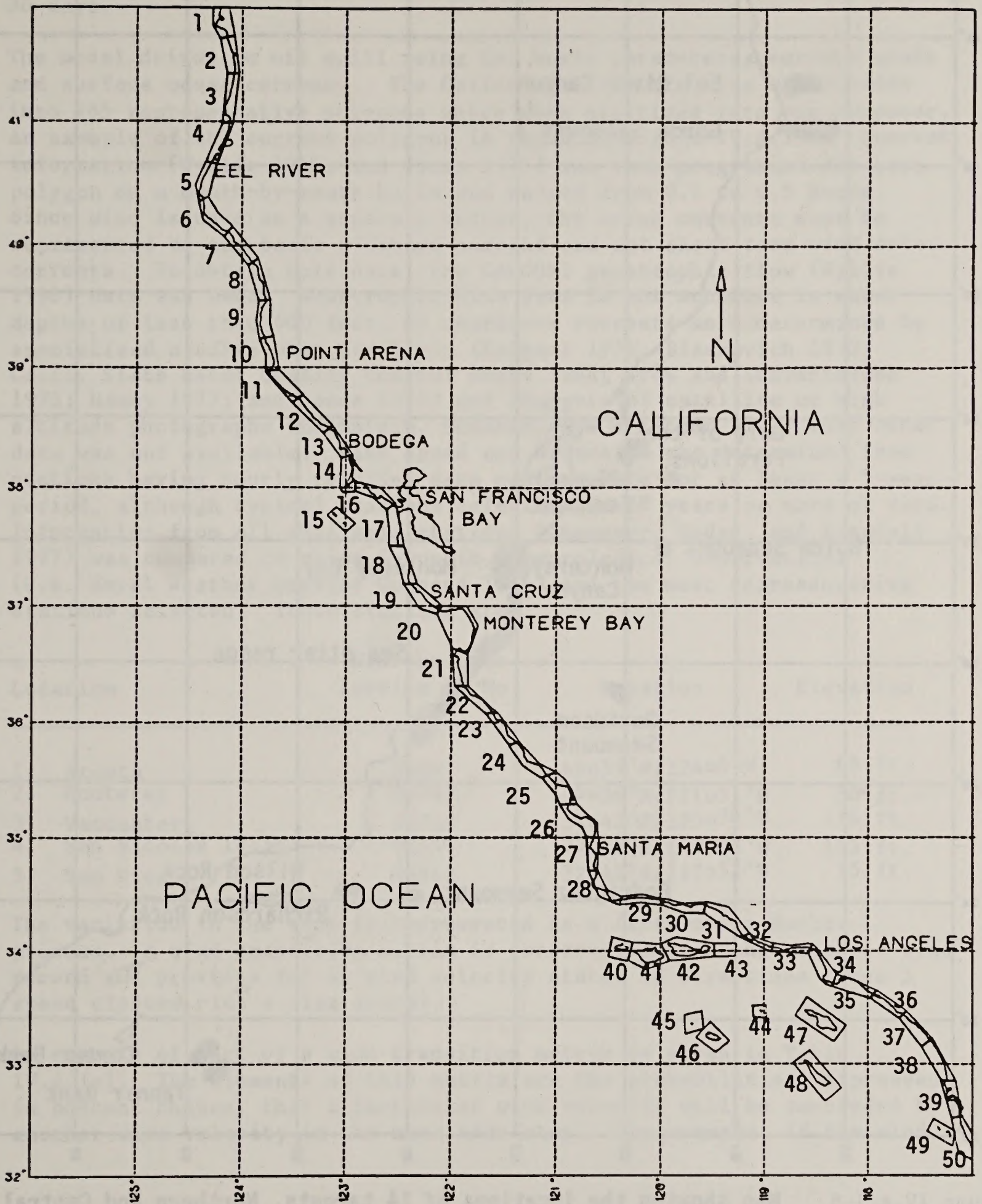


Figure IV.A.1-4 Map showing the division of the shoreline of Central and Northern California into segments of approximately equal length.

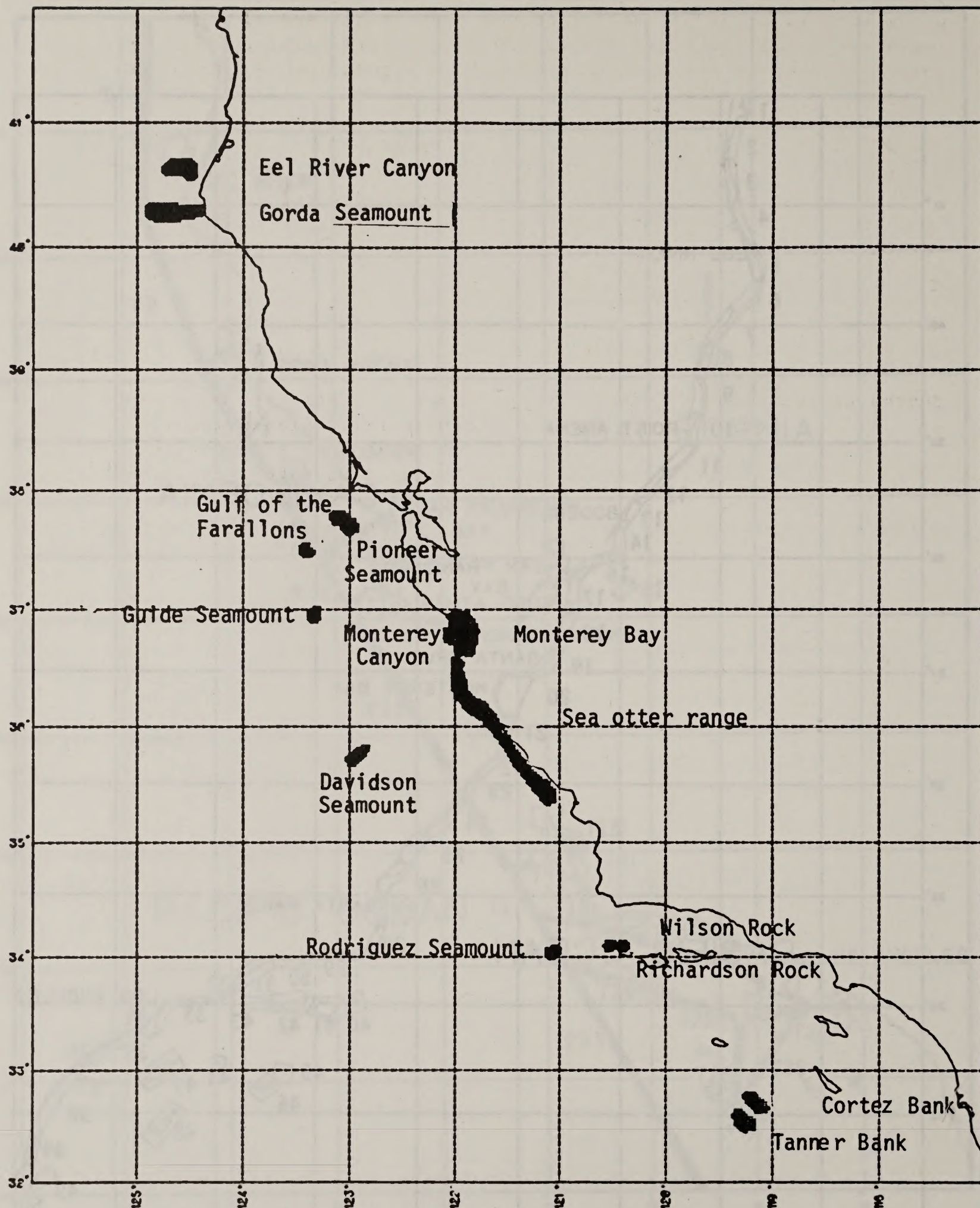


Figure IV.A.1-5 Map showing the locations of 14 targets, Northern and Central California OCS Lease Sale 53: cross hatching indicates areal extent of targets.

is significantly less (and, therefore, represents less of a target) than that of the sea otter range shown on the same figure. The computer is programmed to treat "at-sea" resource impacts differently. A "hit" is registered, but the spill trajectory is not terminated and keeps on going until it either impacts a shoreline segment or is terminated after 30 days.

The model drives an oil spill using two basic parameters, surface winds and surface ocean currents. The California offshore area was divided into 785 representative polygons which were digitized into the computer. An example of the current polygons is shown in Figure IV.A.1-6. Current information (Wyllie 1966, and Jones 1971) was then programmed for each polygon on a month-by-month basis and ranged from 0.1 to 0.5 knots. Since wind is used as a separate vector, the ocean currents must be represented as the basic offshore current and not short term wind driven currents. To obtain this data, the CALCOFI geostrophic flow (Wyllie 1966) data was used. Geostrophic flow data is not accurate in water depths of less than 600 feet, so nearshore currents were determined by specialized studies when available (Kolpack 1971; Blaskovich 1973; Calif. State Water Quality Control Board 1965; Crow and Schwartzlose 1972; Hamby 19??; and Jones 1971) and analysis of satellite or high altitude photographs (Bernstein, Breaker, and Whritner 1977) when other data was not available. Wind speed and direction was determined from stations having hourly recorded data continuously for at least a 5-year period, although typical stations selected had 20 years or more of data. Information from all available stations (Changery, Hodge, and Ramsdell 1977) was compared to ships Synoptic Meteorological Observations (U.S. Naval Weather Service Command 1976) and the most representative stations selected. These stations are:

Location	U.S. Weather Service ID No.	Location	Elevation
1. Arcata	24283	40o59'N/124o6'W	69 ft.
2. Monterey	23245	36o36'N/121o51'W	50 ft.
3. Vandenberg	93214	34o43'N/120o34'W	116 ft.
4. San Nicolas Island	93116	33o15'N/119o28'W	153 ft.
5. San Diego	93112	32o43'N/117o12'W	15 ft.

The variation in the wind is represented as a first-order Markov process. A wind transition matrix is constructed from the historic wind record and provides for 41 wind velocity states (8 directions times 5 speed classes plus a clam state).

An example of part of a wind transition matrix is shown in Table IV.A.1-1. The elements of this matrix are the probabilities, expressed in percent chance, that a particular wind velocity will be succeeded by another wind velocity in the next time step. For example, if the wind

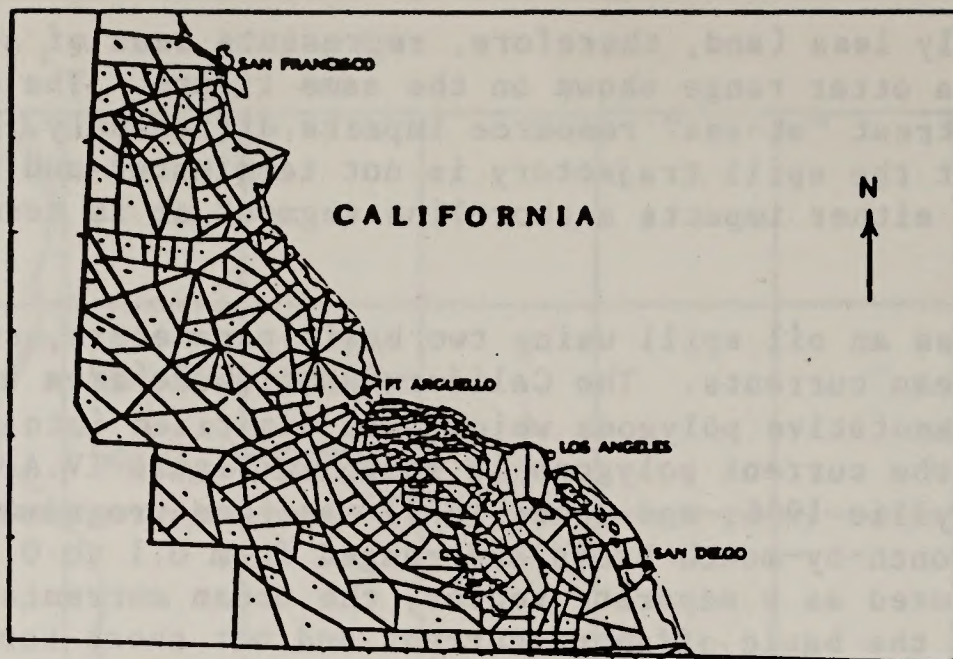


Figure IV.A.1-6 Map showing representative ocean current polygons

TABLE IV.A.1-1

EXAMPLE OF A PORTION OF A 3-HOUR WIND TRANSITION PROBABILITY MATRIX

Probability of wind velocity class
for next three-hour period, expressed
as percent chance.

Present velocity class	Direction: Speed:	CALM	N	NE
		510152025	510152025	510152025

DIR	SPD													
CALM	C	27	2	1	0	0	0	3	0	0	0	0	0	0
N	5	28	10	13	1	0	0	6	1	0	0	0	0	0
N	10	10	15	22	6	0	0	9	1	0	0	0	0	0
N	15	6	0	11	0	0	0	0	0	0	0	0	0	0
N	20	50	0	50	0	0	0	0	0	0	0	0	0	0
N	25	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	5	26	6	1	0	0	0	9	1	0	0	0	0	0
NE	10	22	0	22	0	0	0	0	0	0	0	0	0	0
NE	15	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	20	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	25	0	0	0	0	0	0	0	0	0	0	0	0	0

* Indicates greater than 99 percent probability.

is from the north at 10 knots, Row 3 of the matrix shows there is a 22 percent chance that, in 3 hours, the wind will still be from the north at 10 knots, and that there is a 9 percent chance it will be from the northeast at 5 knots. If the present state of the wind is given, then the next wind state is chosen by randomly sampling according to the percentages given in the appropriate row of the matrix.

Once the targets, winds and currents have been identified and a set of potential oil spill launch points has been chosen to represent the places where oil spills could occur due to OCS production or oil transportation, the hypothetical oil spill trajectories can be simulated. From each of the launch points, the model simulates, in a Monte-Carlo fashion, 500 hypothetical trajectories per season for a total of 2,000 per year (for each potential launch point). The movement of each simulated oil spill is determined, in 3-hour increments, as the sum of a current vector and a wind vector. The current vector is determined by the spill's location and the simulated month; the wind vector is selected by sampling the wind transition probability matrix of the appropriate wind zone and season and was set equal to 3.5 percent of the wind velocity, and rotated 20 degrees clockwise to account for Coriolis effects. Each grid cell through which the spill passes is checked for the presence of land or targets, and contacts are recorded. Simulation of an oil spill ceases when it: 1) contacts land, 2) moves beyond the limits of the base map, or 3) continues beyond 30 simulated days.

By examining data from the trajectory simulations, the model calculates the probability that, if an oil spill occurs at a given launch point, it will contact a particular target or land segment within 3, 10, or 30 days. The three time periods were chosen to represent various milestones during an oil spill:

3 days - While most of the toxic fractions of the oil will evaporate or dissolve along with the 50 percent of crude oil that normally disappears within the first 24 hours of release, frequently the oil spill will not have moved very far. Three days were selected as allowing for the oil spill to have moved a reasonable distance, but still dealing with freshly weathered oil.

10 days - Sufficient time for cleanup measures from nearby oil spill cooperatives, contractors, etc., to have been employed.

30 days - The oil spill will probably not be detectable if still at sea.

Assessment of oil spill risks requires both the conditional probabilities showing where a spill will go if it occurs, and the

probabilities showing where a spill will go if it occurs, and the probability of oil spills occurring in the first place.

The probability of an oil spill occurring in California offshore waters is statistically difficult to establish with any meaning because of the very low accident rate. Since 1963, when drilling began in Federal OCS water off California, over 507 wells have been drilled (plus 8 off Oregon and 4 off Washington) with the 1969 Santa Barbara oil spill the only accident occurring as a result of all this activity. In addition to this activity in federal waters, over 3,000 wells have been drilled in state offshore waters with no accidents.

The risk of an oil spill caused by seismic activity will have to be assumed to be zero as there has never been an oil spill caused because of seismic activity. This includes the Santa Barbara Channel which has a long history of oil development and is also the site of several major earthquakes that have occurred, some recently and near existing wells.

For modeling purposes, oil spill occurrence is treated as a Poisson process, in which the exposure variable is the volume of oil produced or transported. To provide a larger statistical base, the spill rate for spills of over 1,000 barrels was determined as shown in Table IV.A.1-2.

Statistical distributions for estimating probabilities of oil spill occurrence were taken from Devanney and Stewart (1974) and Stewart (1975), and from USGS files of offshore platform accidents. Besides the fundamental assumption that realistic estimates of future spill frequencies can be based on past OCS experience, use of these distributions requires the further assumptions that spills occur independently of each other (as a Poisson process), and that spill rate is dependent on volume of oil produced and handled. The first assumption, that past spill rates are indicative of future spill rates, might be modified either by assuming a decrease in future spill rates due to experience and improved standards, or by assuming an increase because of unknown conditions in new territory. The assumption that spills occur independently of each other could be modified by assuming a positive correlation (if a spill occurs, conditions are such that more will follow shortly) or by assuming a negative correlation (if a spill occurs, extra precautions are taken). This analysis takes the middle ground between these two assumptions by using the historic spill rates. The final assumption, that the spill rate is a function of the volume of oil handled, might be modified on the basis of size, extent, frequency, or duration of the handling. In the case of tanker transport, for example, the number of port calls and the number of tanker-years have been contemplated (Stewart 1976; and Stewart and Kennedy 1978). This analysis uses volume of oil handled, since all other estimates must ultimately be derived from this quantity.

Spill statistics under 1,000 bbls are difficult to evaluate historically

TABLE IV.A.1-2

HISTORIC OIL SPILL OCCURRENCE RATES USED IN MODEL
(Spills over 1,000 barrels)

<u>Spill Source</u>	<u>No. of Spills</u>	<u>Volume Handled (millions of bbls)</u>	<u>Data Source</u>	<u>Area Covered</u>	<u>Time Period Covered</u>
Platforms	7	3,900	USGS accident files	U.S.	1964-78
Pipelines	11	4,780	Stewart (1975), p. 32) and personal communication May, 1977	U.S.	1964-75
Tankers	178	45,941	Stewart (1976,	World- wide	1969-73

TABLE IV.A.1-3

HISTORIC OIL SPILL OCCURRENCE RATES OF SPILLS
OF LESS THAN 1,000 BARRELS

Platform: 0.000045/BBL produced
Pipeline: 0.000015/BBL produced
Tanker: 0.000346/BBL produced

TABLE IV.A.1-4

EXPECTED NO. OF OIL SPILLS UNDER 1000 BBL'S

Scenario 1: Pipelines and Tankering to California Refineries

Area	Platform ^a	Pipeline ^a	Tanker	Total
Point Arena	3.47	0	11.05	14.52
Bodega	1.12	0	3.54	4.66
Santa Cruz	15.81	15.81	0	31.62
Santa Maria	56.24	56.24	0	112.48
Sale No. 53	76.64	72.05	14.59	163.28

^b(5.45 spills of <1000 BBL's/year)

Scenario 2: 100% Tankering to California Refineries

Area	Platform ^a	Pipeline ^a	Tanker	Total
Point Arena	3.47	0	5.52	8.99
Bodega	1.12	0	9.06	10.18
Santa Cruz	15.81	0	49.94	65.75
Santa Maria	56.24	0	88.23	145.07
Sale No. 53	76.64	0	153.35	229.99

^b(7.67 spills of <100 BBL's/year)

Scenario 3: 100% Tankering to Gulf Coast Refineries

Area	Platform ^a	Pipeline ^a	Tanker	Total
Point Arena	3.47	0	2.76	6.23
Bodega	1.12	0	4.53	5.65
Santa Cruz	15.81	0	24.97	40.78
Santa Maria	56.24	0	44.42	100.66
Sale No. 53	76.64	0	76.68	153.32

^b(5.11 spills of <1000 BBL's/year)

^aStatistics are only available for the joint category of platform and pipeline spills. It has been assumed that there is a 50-50 split between pipeline and platform related spills in this table.

^bThis is the statistical assumption upon which the table is based. The number of spills is based on Gulf of Mexico statistics.

TABLE IV.A.1-5

EXPECTED NO. OF OIL SPILLS OF 1000 BBL'S OR GREATER

Scenario 1: Pipelines and Tankering to California Refineries

Area	Platform	Pipeline	Tanker	Total
Point Arena	.04	0	.05	.09
Bodega	.01	0	.08	.09
Santa Cruz	.20	.26	0	.46
Santa Maria	.72	.93	0	1.65
Sale No. 53	.97	1.19	.13	2.29

Scenario 2: 100% Tankering to California Refineries

Area	Platform	Pipeline	Tanker	Total
Point Arena	.04	0	.05	.09
Bodega	.01	0	.08	.09
Santa Cruz	.20	0	1.22	1.42
Santa Maria	.72	0	.78	1.50
Sale No. 53	.97	0	2.13	3.10

Scenario 3: 100% Tankering to Gulf Coast Refineries

Area	Platform	Pipeline	Tanker	Total
Point Arena	.04	0	.05	.09
Bodega	.01	0	.08	.09
Santa Cruz	.20	0	.11	.31
Santa Maria	.72	0	.89	1.61
Sale No. 53	.97	0	1.13	2.10

Spill statistics under 1,000 bbls are difficult to evaluate historically because of the manner in which the data was recorded and the discrepancies between the data collected by different agencies. Based on the Gulf of Mexico statistics, BLM selected the data shown in Table IV.A.1-3 for use in OCS Sale No. 35 (Bureau of Land Management 1975) and which has been used in subsequent sales.

The statistical breakdown of spills by area is shown in Tables IV.A.1-4 and -5. Estimates of the quantities of oil for the areas being evaluated are:

	<u>Risked Mean Values In bbls of Oil</u>	<u>Launch Points Representative Proposed Areas of Leasing</u>
Eel River	0	(P ₁ , P ₂)
Point Arena Bodega	25 8	(P ₃) (P ₄)
Santa Cruz	113	(P ₅ , P ₅ , P ₇)
Santa Maria	402	(P ₈ , P ₉ , P ₁₀ , P ₁₁ , P ₁₂)
Total	548	

These were further broken down into potential launch points as shown on Figure IV.A.1-1. The groupings are shown above.

To determine cumulative OCS impacts, the risked mean reserve and resource estimates of oil in millions of barrels was also determined for the existing federal OCS leases in southern California illustrated on Figure IV.A.1-2.

The reserve estimate for the Santa Barbara and San Pedro areas is 695 million barrels of oil and the resource estimates by area are as follows:

	<u>M Bbls of Oil</u>	<u>Launch Points Representative of Existing Areas of Leasing</u>
Santa Barbara Channel	152	(E1)
Santa Rosa Island	10	(E2)
Santa Barbara Island	15	(E3)
Tanner/Cortes Banks	181	(E4)
San Pedro	36	
Total	394	

The three potential transportation scenarios as described in Section IV.A.8 were modeled to determine potential oil spill impacts. Scenarios 1 and 1-A are assumed to be the same for oil spill modeling purposes.

The amount of oil multiplied by the spill factor times a factor determined by the conditional probability of a spill impacting a resource provides the probability of a resource or shoreline segment being impacted. Primary emphasis has been placed on identifying targets with an impact probability of 5 percent or more only to simplify the analysis. These targets are shown in Table IV.A.1-6. A more detailed breakdown of the shoreline segments reflecting an impact of 5 percent or greater is given in Table IV.A.1-7.

TABLE NO. IV.A.1-6
PROBABILITY OF OIL SPILL IMPACT AS A FUNCTION OF OCCURRENCE

	Shoreline Segment No.	Probability of Impact				Impact as a Function of Time		
		Transportation Scenario No. 1	Transportation Scenario No. 2	Transportation Scenario No. 3		No. 1	No. 2	No. 3
Shoreline Segment	Farallon Island	15	8	10	Note: Upper left corner shows worst case (30 days) Sale No. 53 impact probability. Lower right corner shows combined impact (30 day) of Sale No. 53 plus other projected oil transport related activities.	1	1	
	Marin County & San Mateo County	17	6	13		5	8	6
	San Mateo County	18	20	21		2	8	10
	San Mateo County & Santa Cruz County	19	9	16		5	6	13
	Santa Luis Obispo County	25	24	25		10	7	3
	San Luis Obispo County	26	5	8		17	20	18
	San Luis Obispo County & Santa Barbara County	27	6			1	4	5
	San Miguel Island	40	21	5		3	6	
	Santa Rosa Island	41	22	6		15	1	
	Santa Cruz Island	42	15			19	21	3
	Anacaps Island	43	11	14		12	3	5
	Catalina Island	47	34	36		14	15	
	Rodriguez Seamount		9	42		0	4	0
	Gulf of the Farallons		19	73		9	11	12
	Sea Otter Range		11	48		3	7	9
Resource Category	Richardson Rock		12	57	Note: Top number indicates probability of oil spill impact within 30 days. Lower left indicates probability of an oil spill impact within 30 days. Lower right indicates probability of oil spill impact within 30 days. Note: All numbers indicate probability in percent.	12	14	14
	Wilson Rock		7	8		3	3	1
	Tanner Bank		12	7		9	12	12
	Cortes Bank		14	15		9	6	14
			17	16		16	22	11
			37	33		0	6	0

TABLE IV.A.1-7

DEFINITION OF SHORELINE SEGMENTS

Shoreline Segment No. 17 (San Francisco and part of San Mateo County)

Significant Areas Within Segment:

Point San Pedro, San Francisco, San Francisco Bay, Point Bonita, Golden Gate National Recreation Area

Significant Categories of Impact:

Pinnipeds (Point San Pedro), kelp beds, rocky intertidal areas, sportfishing areas, high intensity use beaches (Sharp Park, Marin Headlands State Park, Montara State Beach, Thorton State Beach, Golden Gate Park, Seal Rocks State Beach, Baker State Beach), Steinhart Aquarium, recreational boating areas, major commercial ports (San Francisco, Oakland Harbor, Richmond Harbor), and known historical sites. Thornton State Beach, Gray Whale Cove, Devils Slide (geohazard)

Shoreline Segment No. 18 (Parts of San Mateo and Santa Cruz Counties)

Significant Areas Within Segment:

Pescadero Point, Martins Beach, Half Moon Bay, Point Montara

Significant Categories of Impact:

ASBS (James Fitzgerald), Marine Life Refuge (James Fitzgerald), Pescadero Creek, seabird breeding and nesting areas, kelp beds, rocky intertidal areas, sportfishing, high intensity use beaches (Half Moon Bay State Beach, San Gregorio State Beach, Pomponio State Beach, Pescadero State Beach, Bean Hollow State Beach), marina and harbor (Half Moon Bay), recreational boating areas, and known historical sites. Pescadero Marsh, Tunitas Beach, Martin's Beach

Shoreline Segment No. 19 (Santa Cruz County)

Significant Areas Within Segment:

Davenport, Ano Nuevo Bay, Ano Nuevo Island, Point Ano Nuevo, Pigeon Point

Significant Categories of Impact:

ASBS (Ano Nuevo), pinnipeds (Ano Nuevo Island, Ano Nuevo Bay, Pigeon Point), kelp beds, rocky intertidal areas, sportfishing areas, clam beaches (Point Ano Nuevo, Ano Nuevo Bay), high intensity use beaches (Ano Nuevo State Reserve), and known historical sites.

Shoreline Segment No. 25 (San Luis Obispo County)

Significant Areas Within Segment:

Morro Bay, Cuyucos, Point Estero, Cambria, Morro Bay estuary

Significant Categories of Impact:

Rare and endangered species (American Peregrin Falcon, Morro Bay Kangaroo Rate, Sea Otter), kelp beds, rocky intertidal areas, sportfishing areas, oyster beds (Morro Bay Oyster farm), clam beaches (Morro Bay, Cuyucos), high intensity use

TABLE IV.A.1-7 (Cont.)

beaches (Cukyucos State Beach, Atascadero State Beach, Morro Strand State Beach, Morro Rock Natural Reserve, Morro Bay State Park), skin and SCUBA diving areas, major commercial port (Morro Bay harbor), recreational boating areas, and known historic sites.

Shoreline Segment No. 26 (San Luis Obispo County)

Significant Areas Within Segment:

Oceano, Pismo Beach, San Luis Obispo Bay, Avila Beach, Point San Luis, Point Buchon

Significant Categories of Impact:

Sensitive biological areas (Dune Lake, Oso Flace Lake, Santa Maria River), Sea bird breeding and nesting areas (Point San Luis, Point buchon), pinnipeds (Point San Luis, Point Buchon), kelp beds, rocky intertidal areas, sportfishing areas, clam beaches (Oceano, Pismo Beach, Avila Beach), high intensity use beaches (Avila State Beach, Montana de Oro State Park, Pismo State Beach), skin and SCUBA diving areas, marinas and harbors, recreational boating areas, and known historic sites.

Shoreline Segment No. 27 (Santa Barbara County)

Significant Areas Within Segment:

Purissima Point, Point Sal, Santa Maria, Guadalupe, Santa Maria

Significant Categories of Impact:

Pinnipeds (Point Sal), rocky intertidal areas, sportfishing areas, high intensity use beaches (Point Sal State Beach), and a known historic site.

Shoreline Segment No. 15 (Farallon Islands) - San Francisco County

Significant Categories of Impact:

ASBS, National Wildlife Refuge, sea bird breeding and nesting area, pinnipeds and sportfishing area.

Shoreline Segment No. 40 (San Miguel Island) - Santa Barbara County

Significant Areas Within Segment:

Richardson Rock, Wilson Rock, Point Bennett, Harris Point, Prince Island, Cardwell Point

Significant Categories of Impact:

ASBS, rare and endangered species (Island fox, California least tern), seabird breeding and nesting area, pinnipeds, kelp beds, rocky intertidal areas, sportfishing areas, skin and SCUBA diving area, Channel Islands National Park.

Shoreline Segment No. 41 (Santa Rosa Island) - Santa Barbara County

Significant Areas Within Segment:

Carrington Point, East Point, South Point Bee Rock, Sandy Point, Beckers Beach, Cluster Point

TABLE IV.A.1-7 (Cont.)

Significant Categories of Impact:

Areas of Special Biological Significance (ASBS), rare and endangered species (Island fox), seabird breeding and nesting area, pinnipeds, kelp beds, rocky intertidal areas, sport-fishing areas, skin and SCUBA diving areas, recreational boating area, Channel Islands National Park.

Shoreline Segment No. 42 (Santa Cruz Island) - Santa Barbara County

Significant Areas Within Segment:

West Point, Diablo Point, Chinese Harbor, San Pedro Point, Bowen Point, Gull Island, Kinto Point

Significant Categories of Impact:

ASBS, rare and endangered species (Island fox), seabird breeding and nesting area, pinnipeds, kelp beds, rocky intertidal areas, sportfishing areas, skin and SCUBA diving areas, and a recreational boating area, Channel Islands National Park.

Shoreline Segment No. 43 (Anacapa Island) - Ventura County

Significant Categories of Impact:

ASBS, rare and endangered species (California Brown Pelican), seabird breeding and nesting area, pinnipeds, kelp beds, rocky intertidal areas, sportfishing area, skin and SCUBA diving area, recreational boating area and a known historical site, Channel Islands National Park.

Shoreline Segment No. 47 (Catalina Island) - Los Angeles County

Significant Areas Within Segment:

West end, Isthmus Cove, Long Point, Avalon, Little Harbor, Catalina Harbor, Farnsworth Bank

Significant Categories of Impact:

ASBS, ecological reserve (Farnsworth Bank, Lovers Cove), rare and endangered species (Island fox), seabird breeding and nesting area, pinnipeds, kelp beds, rocky intertidal areas, sportfishing area, skin and SCUBA diving area, marina and harbor (Avalon and Isthmus Cove), USC Marine Laboratory.

Table IV.A.1-6 is interpreted as follows. The target impacted can be determined by the shoreline segment number or resource category name. Locations of these targets can be determined from Figure IV.A.1-4 and -5. A rough idea of the location of a shoreline segment can be determined from the left column; however, more detailed information about the area covered can be obtained from Table IV.A.1-7. The shoreline segments are not located relative to particular county lines. The mapping started at the Oregon border and goes down the coast in approximately 27 mile increments. Offshore islands are also represented in this manner. The impact of the sale is then shown for each transportation scenario. Looking at the Farallon Island's (Segment No. 15), Transportation Scenario shows an 8/13. This indicates that only considering the potential impact of Sale No. 53, there is an 8 percent chance of the Farallon's being impacted by an oil spill. Considering existing tanker traffic and/or other activities, there is a cumulative possibility of 13 percent of an oil spill impact. Proceeding further to the right, column No. (indicating again Transportation Scenario No. 1) shows a 1, 5 and 8. This means that of the 8 percent chance of impact shown in the left column, there is a 1 percent chance of impact within 3 days, 5 percent chance of impact within 10 days, and 8 percent chance of impact within 30 days. By looking at the different percentages as a function of time, a clearer understanding can be obtained as to how long the oil will be in transit (how weathered it will be or how much may have dissipated naturally if no recovery attempts were made).

Table IV.A.1-8 shows the shoreline segments and resource categories that have a 4 percent or less chance of being impacted. Shoreline segments not listed do not register any impact using the oil spill model.

To provide further insight into the behavior of a potential oil spill as a function of time, Tables IV.A.1-9, -10 and -11 show the conditional probabilities. Across the top of each table, potential launch points have been selected and a spill assumed to have occurred. For each of the high impact (5 percent or greater) targets, the potential impact as a function of 3, 10 and 30 days is shown. The probabilities do not correlate directly with the probabilities shown in Tables IV.A.1-4 and -6 because in this case it has been assumed that a spill has occurred (you are not predicting the probability of a spill occurring).

Shoreline Segment No	Transportation Scenario #1	Transportation Scenario #2	Transportation Scenario #3
1	2	3	4
2	3	4	5
3	4	5	6
4	5	6	7
5	6	7	8
6	7	8	9
7	8	9	10
8	9	10	11
9	10	11	12
10	11	12	13
11	12	13	14
12	13	14	15
13	14	15	16
14	15	16	17
15	16	17	18
16	17	18	19
17	18	19	20
18	19	20	21
19	20	21	22
20	21	22	23
21	22	23	24
22	23	24	25
23	24	25	26
24	25	26	27
25	26	27	28
26	27	28	29
27	28	29	30
28	29	30	31
29	30	31	32
30	31	32	33
31	32	33	34
32	33	34	35
33	34	35	36
34	35	36	37
35	36	37	38
36	37	38	39
37	38	39	40
38	39	40	41
39	40	41	42
40	41	42	43
41	42	43	44
42	43	44	45
43	44	45	46
44	45	46	47
45	46	47	48
46	47	48	49
47	48	49	50
48	49	50	51
49	50	51	52
50	51	52	53
51	52	53	54
52	53	54	55
53	54	55	56
54	55	56	57
55	56	57	58
56	57	58	59
57	58	59	60
58	59	60	61
59	60	61	62
60	61	62	63
61	62	63	64
62	63	64	65
63	64	65	66
64	65	66	67
65	66	67	68
66	67	68	69
67	68	69	70
68	69	70	71
69	70	71	72
70	71	72	73
71	72	73	74
72	73	74	75
73	74	75	76
74	75	76	77
75	76	77	78
76	77	78	79
77	78	79	80
78	79	80	81
79	80	81	82
80	81	82	83
81	82	83	84
82	83	84	85
83	84	85	86
84	85	86	87
85	86	87	88
86	87	88	89
87	88	89	90
88	89	90	91
89	90	91	92
90	91	92	93
91	92	93	94
92	93	94	95
93	94	95	96
94	95	96	97
95	96	97	98
96	97	98	99
97	98	99	100

Lower right corner shows combined impact (30 day) of Sale No. 53 plus other projected oil transport related activities.

#1	#2	#3
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Note: All numbers indicate probability in percent.

PROBABILITY OF OIL SPILL IMPACT AS A FUNCTION OF OCCURRENCE

TABLE IV.A.1-9

CONDITIONAL PROB-
ABILITY OF OIL
SPILL IMPACT AS
A FUNCTION OF
TRACTS

Note: Assuming
that an oil spill
does take place
in a given area
(P. etc.), the
probability of
impact is shown
within:

top - 3 days
lower left-10 days
lower right-30 days

Note: All numbers
indicate probability
in percent.

Shoreline Segment No.	Resource Category	Pt.												Santa Maria											
		Bel River			Arena			Bodega			Santa Cruz			P8			P10			P11			P12		
		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24
Parallon Island	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Mateo County	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Mateo County	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Cruz County	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Luis Obispo County	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Luis Obispo County	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Barbara County	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Miguel Island	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Rosa Island	41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Santa Cruz Island	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Anacapa Island	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Catalina Island	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rodriguez Seamount		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gulf of the Farallones		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sea Otter Range		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Richardson Rock		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wilson Rock		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tanner Bank		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cortez Bank		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Shoreline Segment

Resource Category

TABLE IV.A.1-10

CONDITIONAL PROBABILITY OF OIL SPILL IMPACT AS A
FUNCTION OF EXISTING DEVELOPMENT

Note: Assuming that an oil spill does take place
in a given area (E1, etc.) the probability of impact
is shown within:

top - 3 days
lower left - 10 days
lower right - 30 days

Shoreline Segment	Shoreline Segment No.	E1 Santa Barbara Channel	E2 Santa Rosa Island	E3 Santa Barbara Channel	E4 Tanner/Cortes Banks	E5 San Pedro
San Mateo County	17	0	0	0	0	0
San Mateo County	18	0	0	0	0	0
Santa Cruz County	19	0	0	0	0	0
San Luis Obispo County	25	0	0	0	0	0
San Luis Obispo County	26	0	0	0	0	0
Santa Barbara County	27	0	0	0	0	0
Farallon Island	15	0	0	0	0	0
San Miguel Island	40	6 8 9 1 1	0 1 1	0 0	0 0	0 0
Santa Rosa Island	41	6 11 12 3 3	2 3 3	0 2 3	0 0 1	0 0 1
Santa Cruz Island	42	21 30 32	0 0 1	0 0 1	0 0 1	0 0 1
Anacapa Island	43	8 11 12 0 1 1	0 0 1 0 1	0 0 1	0 0 1	0 0 1
Catalina Island	47	0 1 1 1 5 6 11 0 2 13 15	0 0 0 0 1	0 0 0 0 1	0 0 0 2 13 15	1 1 1 1 1
Rodriguez Seamount	(4)	0 1 0 1	0 1 0 1	0 0 0 0	0 0 0 0	0 0 0 0
Gulf of the Farallons	(7)	0	0	0	0	0
Sea Otter Range	(10)	0 1 0 1	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
Richardson Rock	(11)	7 10 0 1	0 0 0 1	0 0 0 0	0 0 0 0	0 0 0 0
Wilson Rock	(12)	7 9 10 0 1	0 0 0 0 1	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0
Tanner Rock	(13)	0 2 3 9 0 3	0 0 0 9 0 3	0 0 0 3 61 63	0 57 0 61 63	0 0 1 0 1
Cortes Bank	(14)	0 2 1 5 0 3	0 1 5 0 3	0 3 16 18	0 11 16 18	0 0 0 0

Shoreline Segment

Resource Category

Note: Assuming that an oil spill does take place within a given tanker/pipeline segment (T, etc.) the probability of impact is shown within:

Resource Category

TABLE IV.A.1-12
STATISTICALLY EXPECTED NUMBER OF SPILLS
GREATER THAN 1 BBL^a

Oil Spills

Calculations According to Dames & Moore Analyses Predicted by BLM

TRANSPORTATION SCENARIO 1
(Pipelines and Tankering to California Refineries)

	Blowouts	Platforms	Pipelines	Tankers (Hull)	Tankers (Non-Hull)	Total	Less than 1000 bbls	Greater than 1000 bbls
Point Arena	0.23	1.06	-	0.34	2.47	4.10	14.52	.09
Bodega	0.07	0.57	-	0.34	2.47	3.45	4.66	.09
Santa Cruz	0.35	1.62	6.97	-	-	8.94	31.62	.46
Santa Maria	<u>0.87</u>	<u>3.87</u>	<u>6.56</u>	<u>-</u>	<u>-</u>	<u>11.30</u>	<u>112.48</u>	<u>1.65</u>
Total	1.52	7.12	13.53	0.68	4.94	27.79	163.28	2.29

TRANSPORTATION SCENARIO 2
(100 Percent Tankering to California Refineries)

	Blowouts	Platforms	Pipelines	Tankers (Hull)	Tankers (Non-Hull)	Total	Less than 1000 bbls	Greater than 1000 bbls
Point Arena	0.23	1.06	-	0.34	2.47	4.10	8.99	.09
Bodega	0.07	0.57	-	0.34	2.47	3.45	10.18	.09
Santa Cruz	0.35	1.62	-	0.34	2.47	4.78	65.75	1.42
Santa Maria	<u>0.87</u>	<u>3.87</u>	<u>-</u>	<u>0.34</u>	<u>2.47</u>	<u>7.55</u>	<u>145.07</u>	<u>1.50</u>
Total	1.52	7.12	-	1.36	9.88	19.88	229.99	3.10

TRANSPORTATION SCENARIO 3
(100 Percent Tankering to Gulf Coast Refineries)

	Blowouts	Platforms	Pipelines	Tankers (Hull)	Tankers (Non-Hull)	Total	Less than 1000 bbls	Greater than 1000 bbls
Point Arena	0.23	1.06	-	1.02	7.42	9.73	6.23	.09
Bodega	0.07	0.57	-	0.68	4.95	6.27	5.65	.09
Santa Cruz	0.35	1.62	-	1.02	7.42	10.41	40.78	.31
Santa Maria	<u>0.87</u>	<u>7.12</u>	<u>-</u>	<u>2.71</u>	<u>19.79</u>	<u>27.24</u>	<u>100.66</u>	<u>1.61</u>
Total	1.52	7.12	-	5.43	39.58	53.65	153.32	2.10

^aBased on the "most probable" OCS Lease Sale No. 53 resource estimate development scenario.

TABLE IV.A.1-13

OIL SPILL PROBABILITY AS A FUNCTION OF SPILL SIZE^a

TRANSPORTATION SCENARIO 1
(Pipelines and Tankering to California Refineries)

Spill Size (bbl)	Statistically Expected Number of Spills	Probability of Occurrence during the Project Lifetime of		
		Zero Spills	One Spill	More Than One Spill
10	6.738	0	0.01	0.99
100	1.767	0.17	0.30	0.53
1,000	0.954	0.38	0.37	0.25
10,000	0.463	0.63	0.29	0.08
50,000	0.228	0.80	0.18	0.02

TRANSPORTATION SCENARIO 2
(100% Tankering to California Refineries)

Spill Size (bbl)	Statistically Expected Number of Spills	Probability of Occurrence during the Project Lifetime of		
		Zero Spills	One Spill	More Than One Spill
10	4.930	0.01	0.04	0.95
100	1.696	0.18	0.31	0.51
1,000	0.987	0.37	0.37	0.26
10,000	9.467	0.63	0.29	0.08
50,000	0.228	0.80	0.18	0.02

TRANSPORTATION SCENARIO 3
(100% Tankering to Gulf Coast Refineries)

Spill Size (bbl)	Statistically Expected Number of Spills	Probability of Occurrence during the Project Lifetime of		
		Zero Spills	One Spill	More Than One Spill
10	12.881	0	0	1
100	2.890	0.06	0.16	0.78
1,000	1.320	0.27	0.35	0.38
10,000	0.490	0.61	0.30	0.09
50,000	0.228	0.80	0.18	0.02

^a Based on the "most probable" OCS Lease Sale No. 53 resource estimate development estimate.

The oil spill model and the basis of the BLM analysis of the number of oil spills is based on a statistical approach based on the volume of oil produced as explained earlier. After the draft statement for Sale No. 53 was published, Dames and Moore submitted a critique of this approach (Final Report, Critique of the DEIS OCS Lease Sale No. 53 Offshore California for Western Oil and Gas Association dated July 1, 1980). This analysis is based on rig years and pipeline miles and the results are shown in Table IV.A.1-12. They further break down the probability as a function of spill size as shown in Table IV.A.1-13. Using this approach it can be seen that the BLM figures are much higher (by a factor of 6). This EIS, however, continues to use the BLM statistical approach because there is no reason to believe that the probability of an oil spill is primarily a function of rig years or pipeline miles.

The dynamics of an oil spill event are extremely complex. A multitude of factors affect the movement of the spill, its modification and transformation and ultimate disposition in the marine environment. Oil released into the marine environment in substantial quantities rises initially to the ocean's surface, forming a thin uniform layer or "slick." The physical properties of the spill oil, mode of spillage, and the prevailing oceanographic and meteorologic conditions directly affect the rate at which the spilled oil spreads. Mechanisms affecting the spill's subsequent dispersion include:

- Dissolution
- Transport by surface currents
- Spreading and break-up by turbulence
- Biodegradation

Evaporation results in the loss of most volatile petroleum fractions to the atmosphere in a relatively short time. The rate and extent of transfer depends both on the composition of the oil and on the degree of wave and wind agitation. Generally, the higher the degree API, the higher the evaporation rate of volatile petroleum fraction to the atmosphere. For example, crude oil of 40° API can be reduced 50 percent by evaporation or dissolving, most of this within a few days of exposure.

Gross transport of an oil patch by currents is a highly variable phenomenon which is best described in terms of statistics or probabilities. The motion of floating oil consists of a surface drift component which closely follows the wind.

Application of sinking agents to an oil spill is now prohibited by law; however, dispersants can be used if approved by EPA which further complicates analysis of the projected fate of an oil spill. Any trajectory projections will further be modified as it is improbable that an oil spill will be permitted to go naturally. Oil companies and the

U.S. Coast Guard will be attempting to contain and collect it, which will modify spreading and transport conditions.

Conclusion. If it is assumed that an oil spill takes place, the possibility that a spill might hit an adjacent shoreline ranges from 0 to 49 percent. When this is discounted by figuring the amount of oil that might exist and the possibility of a spill occurring based on past statistics, the possibility of impact for a large spill of 1,000 bbls or greater drops to between 0 to 21 percent. These numbers, however, mean little by themselves and can only be used as a comparative tool due to the large number of variables involved. A detailed analysis of these numbers is accomplished in each applicable impact section.

Cumulative Effects. For four northerly groupings of tracts in Sale No. 53, Eel River (gas only), Point Arena, Bodega and Santa Cruz will not have any impact on southern California if an oil spill occurred. Therefore, as there are no other tracts presently leased, the only cumulative impacts from an oil spill would come from tanker traffic. Oil tankers are currently supplying oil to existing facilities in central California and will have to continue unless other sources of oil are provided. If development of offshore oil occurs, it may replace some of this imported oil. The risk of a spill occurring should Sale No. 53 proceed would then be reduced as local oil would be transported in

American ships with American crews operating under rigid safety and training requirements. Development of the Santa Maria tracts would pose the same risk and effects as discussed above and, in addition, would pose some risk to San Miguel Island, Richardson and Wilson Rocks as shown in the previous tables.

Tankering to Los Angeles from the Santa Maria tracts would add to the cumulative pollution of southern California; however, it would replace oil that otherwise would have to be imported and would probably reduce the risk for the same reasons as discussed earlier. Cumulative effects of oil development in southern California are difficult to assess because of the high amount of background pollution discharged by local municipal sewage outfalls.

2. Manmade Structures: Manmade structures are discussed in detail in the Final Environmental Statement for OCS Sale No. 48, Sale No. 53 Proposed Oil and Gas Transportation Scenarios (POCS Reference Paper No. 53-1), and Chevron Proposed Pipeline Installation Santa Barbara Channel 78-EIR-16.

a. Onshore: For the proposed sale area, the following four types of manmade structures are proposed: support bases, pipelines, harbors for supply and crew boats, and airports for helicopters. The new support bases for pipeline construction could temporarily disturb normal onshore activities. Pipelines could cause environmental impact during construction. Use of existing harbors could disturb normal onshore activities. Helicopters could interfere with normal airport activities.

Five temporarily operational support bases could be constructed near each of the five proposed tracts. These support bases could be constructed to store pipes and pipeline construction equipment and materials. Each of these bases could occupy approximately 6 hectares (15 acres). Between Eel River and Mad River for the Eel River tracts; at the Manchester Project site in conjunction with the existing dock at Port Arena for the Point Arena tracts; Bodega Bay for the Bodega tracts; Half moon Bay for the Santa Cruz tracts; and near the Santa Maria River (or existing ports at Morro Bay and or Port San Luis for light cargo and at Port Heuneme or Gaviota Supply Base for heavy cargos) for the Santa Maria tracts. Gaviota Supply Base (Landon 1980) is a proposed supply base which is considered in a feasibility study. This Base is located about 3 miles east of Point Conception and could support the crew and supply boat operation in the Westerly end of Santa Barbara Channel and in the Santa Maria area.

Crew and supply boats could use the existing piers at Humboldt Harbor for the Eel River area, and at San Francisco Harbor for the Santa Cruz area, Bodega area, and Point Arena area. For the Santa Maria area crew boats could use the existing piers at Morro Bay Harbor and Port San Luis. Also, the supply boats for Santa Maria area could use the existing wharf at Port Heuneme or the proposed Gaviota Supply Base.

Crew boats could cause insignificant impact to the operation of existing harbors. Supply boats could cause significant impacts to the operation of existing harbors. Harbors should have space and facilities to handle and store incoming materials by trucks, trains and vessels. Also, harbor should have adequate space and equipments to service the supply boats on powdered drilling mud and drilling cement, additive, drill pipes, well casings, fuel, water, miscellaneous equipments, garbage and waste drilling material.

There could be 322 km (200 miles) of buried onshore pipelines which could have pump and compressor stations along the pipeline right-of-way.

These stations would be powered electrically and would require electrical power from the nearest power sources. During construction, a 30.5 m (100-foot) wide pipeline right-of-way could be required. For operation and maintenance, a 15.2 m (50 feet) wide right-of-way could be adequate.

Helicopter services would be needed to shuttle crews and lighter equipments from the airports to the drillships, pipelay barges, platforms, storage and loading facilities, and floating production systems. Helicopter services would be needed for inspections, emergencies, and special situations. Helicopters could originate from the airports that are located near the five proposed tract areas and are shown in Visual No. 2.

b. Offshore: For the proposed sale area, the following five types of offshore manmade structures are proposed: platforms, storage and loading facilities with single mooring buoy (SMB), subsea production systems or floating production systems with SMB, subsea completion systems, and pipelines. During construction, the above five structures would disturb the sea bottom and could interfere with fishing and navigation. During operation, the five structures could interfere with fishing, and the above first three structures could interfere with navigation. Disturbance of the sea bottom could interfere with biological and cultural resources. The biological resources would include a minimal and shorter term impact on soft bottom and longer term impact on hard bottom. The cultural resources would include aboriginal sites and historic shipwrecks. These offshore structures could cause oil spills and emissions of air pollutants.

The estimated numbers of structures are: 19 platforms, 4 offshore storage and loading facilities with SMB, 6 subsea production systems or floating production system with SMB, 55 subsea completion systems, and 148 km (92 miles) of pipelines.

Each platform could occupy approximately 0.4 ha (1 acre) of sea floor and extend approximately 90 m (300 feet) above the ocean surface. Each floating production system and storage vessel could be a ship with an approximate size of 305 m (100 feet) wide by 229 m (750 feet) long. A drillship could install a subsea completion system. During construction of a subsea completion system, the drillship could interfere with fishing and navigation and could disturb the sea floor when placing the anchors and drilling the wells. Also, during maintenance of a subsea completion system, a service ship could interfere with navigation and fishing. A mooring type of drillship would place 8 anchors and start the well drilling. The anchors could be placed at an approximate distance of 3 to 8 times the water depth of the well. These anchors and chains would disturb the sea floor during emplacement and removal. The pipelines could be laid by a pipe-lay barge which could disturb the sea bed and interfere with fishing and navigation. The lay barge would

place 8 anchors and lay the pipeline on the ocean floor. Anchor placement is similar to the drillship. Unburied pipelines could interfere with trawl fishing; especially, unshrouded valves, taps, and other irregular surfaces. Near shore, from water depth of 61 m (200 feet) to shore, the pipeline could be buried to a minimum of 0.91 m (3 feet) by the jet-sled trenchers and the clamshell digger. The pipeline burial operation could bury about 37 km (23 miles) of pipelines and excavate approximately 96,340 cubic meters (126,000 cubic yards) of sea bottom.

3. Vessel Traffic

a. Tankers and Barges: The source of information for tankers and barges is reported in the Sale No. 53 Proposed Oil and Gas Transportation Scenarios.

Tankers would continuously transport crude oil from the proposed sale areas to the refineries in the San Francisco (SF) Bay area, Los Angeles (LA) Basin, and Gulf of Mexico via Panama Canal. Barges would transport crude oil only to the refineries in the SF Bay area. Tankers and barges to SF Bay area would enter the SF Bay via the Precautionary Area (PA) at the entrance to the SF Bay. Tankers to LA Basin would follow the Point Conception to Point Fermin Traffic Separation Scheme (TSS). Tankers to the Gulf of Mexico would first follow the proposed Point Conception to the California-Oregon Border TSS, then take the route outside of the Santa Barbara Channel to the Panama Canal. Increased use of Tankers and barges could interfere with commercial and recreational vessel traffic. Also, these tankers and barges could cause oil spills and emissions of air pollutants.

For Scenario No. 2, 100 % Tankering, the following tankers and barges are estimated as follows: 1) A 25,000 dwt tanker would transport crude oil from the Point Arena area to the refineries in the SF Bay area by following the proposed TSS and entering the PA at the entrance to SF Bay. The approximate turn around time for the tanker is 4 1/2 days which totals 81 trips per year. 2) A 15,000 barrel barge would transport crude oil from the Bodega area to the SF Bay area by entering PA at the entrance to SF Bay. The approximate turn around time for the barge is 2.8 days which totals 130 trips per year. 3) A 100,000 barrel barge would transport crude oil from the Santa Cruz area to the SF Bay area by entering the PA at the entrance to the SF Bay. The estimated turn around time is 3 days which totals 120 trips per year. 4) A 27,000 dead weight ton (dwt) tanker would transport crude oil from the Santa Maria area to the LA Basin by the Point Conception to Point Fermin TSS. The estimated turn around time is 3 days which totals 120 trips per year.

For Scenario No. 1, Mixed Mode of Pipelines and Tankers, tankering and barging would be used only from the Point Arena and Bodega areas and would be the same as Scenario No. 2. For Scenario No. 3, Tankering to Galveston via the Panama Canal, a 45,000 dwt tanker would be used for each of the proposed areas except from the Bodega area. A 25,000 dwt tanker would be used from the Bodega area. These tankers would follow the proposed TSS to Point Conception; take the route outside the Channel Islands to the Panama Canal; and then on to the Gulf of Mexico.

b. Supply and Crew Boats: The source of information for the supply and crew boats is reported in the Sale No. 53 Proposed Oil and Gas Scenarios, the most probable condition as indicated in Table

I.B.2.d-1, and Chevron and Texaco's Environmental Reports for Exploratory Drilling in the Santa Barbara Channel, and other referenced sources.

Supply and crew boats would continuously service the drillships, pipe-lay barges, platforms, and offshore production and storage vessels. These boats could interfere with commercial vessels, commercial fishing boats, recreation boats, and harbors.

The supply and crew boats would service the five proposed sale areas from the nearest ports. These boats could service the proposed areas as follows: Eel River area by 15 supply and crew boat trips per month from Humboldt Harbor; Point Arena area by 15 supply boat trips per month from the San Francisco Harbor, and the crew by helicopter from the nearby airport (Visual No. 2, Table No. 3); Bodega area by 15 crew and supply boat trips per month from the San Francisco Harbor; Santa Cruz area by 60 supply and crew boat trips per month from the San Francisco Harbor; and Santa Maria area by 120 crew boat trips per month from Morro Bay Harbor and 120 supply boat trips per month from the proposed Gaviota Supply Base or Port Hueneme.

4. Noise and Other Disturbances: Noise emissions resulting from OCS development are associated with the operation of offshore platforms, drilling rigs, petroleum transfer facilities, onshore processing plants, pump stations, helicopters, etc. In addition, construction equipment used during the installation of the various facilities emit various amounts of noise. The degree of noise impact depends upon the emitted sound level and the proximity of the source to a noise sensitive receptor such as a school, hospital, residence, etc. The precise location of the various facilities is not known at this time. Thus, site specific noise impacts cannot be evaluated here; however, they will be considered in a future EIS when development plans are known.

Machinery noise sources found on drilling and production platforms are, generally, similar to those used for shore-based operations. Special noise attenuation devices are sometimes used offshore to protect workers in their living quarters located on the platforms. Compressors and diesel electric engines are usually the loudest equipment on a typical platform emitting about 90 dBA at a distance of 15 m (50 feet). By comparison, a diesel truck under full load also emits about 90 dBA at 15 m. Although other sounds, such as banging of pipes and use of explosives may be more intense, they are of extremely short duration.

In a quiet sea with light wind conditions, normal offshore platform operations would be inaudible beyond about 2 miles (assuming ambient background noise level of 40 dBA and attenuation due to sound wave spreading only). In rough seas and weather conditions, the offshore facility would be inaudible beyond about 1/8 of a mile (assuming 70 dBA background). No onshore noise impact from normal operation of OCS platforms are expected since even under low background noise conditions they would not be audible from shore.

Most of the onshore processing and support facilities would necessarily be located in industrially zoned areas where noise would have a minimal impact. If adjacent sensitive receptors were impacted, mitigation measures such as sound barriers (i.e., earthen berms, block walls, etc.,) and mufflers could be utilized. The site specific noise impact of these developments will be considered in a future EIS when detailed development plans are known.

5. Effluents and Discharges

a. Water: As a result of the proposed sale, the development and operation of offshore oil and gas producing facilities will discharge materials that may potentially have an impact on the natural environment. Material that is discharged from offshore oil and gas operation will result from two types of activities: 1) the normal or routine activities that may occur day-to-day and 2) the episodic or occasional massive emission events (e.g., oil spill) resulting from equipment failure, poor operation techniques, or a variety of events. Materials that will be routinely discharged from oil and gas development and production in northern and central California are drilling cuttings and muds, formation water, and treated sewage. Discharge of effluents from OCS activities is under the jurisdiction of the EPA through the National Pollution Discharge Elimination System permits.

Drill Cuttings and Muds. Once drilling starts, drill cuttings and drilling muds will be dumped into the marine environment. Daily discharge of cutting ranged from 0-28m³/day (0-176 bbl) and 10-20 bbls of drilling muds (ECOMAR, 1978) for a 3,419 m exploratory well.

The total amount of drill cuttings and drilling muds estimated to be discharged into the marine environment as a result of this sale and specific information for each area is given in Table I.B.2.d-2.

It should be noted that the discharge figures given for drilling muds in Table I.B.2.d-2 are liberal. During production phases of OCS operations, drilling muds are normally used in drilling several wells from the same platform. In the case of costly muds, the fluids may be transported to other platforms for use in drilling production wells (Dames and Moore, 1980 comments on DIS for Sale 53).

Drill cuttings are composed of rock fragments and liquids contained in the geological formation through which the drilling bit is traveling. To remove the drill cuttings, drilling mud (fluid) from the mud system (mud tanks) is circulated down the hole (well) through the drill pipe. Drilling mud is passed out through the drilling bit nozzle, picking up drill cuttings, and returns to the surface between the drill pipe and walls of the bore hole and/or casing. At the surface, drill cuttings are physically separated from the mud by screening and washing techniques. After the drill cuttings and drilling mud are separated, the drill cuttings are discharged to the ocean and the mud is returned to the mud tank for recirculation down the hole. Drilling mud that is not able to be separated from the drill cuttings is discharged to the ocean. Additionally, mud is discharged to the ocean when excess mud is generated by:

- (1) Drilled up solid or water is added to adjust the mud properties

- (2) When a completely different mud is needed
- (3) Or, at the conclusion of drilling unless mud can be used in a subsequent well (Sheen Technical Subcommittee 1976)

Removal of drilled cuttings from the hole is only one function of drilling mud. To obtain satisfactory results in the completion of any well, drilling muds have a variety of functions: controlling subsurface pressures, cooling and lubricating the bit and drill pipe, preventing the walls from caving, preventing damaging effects to the formation penetrated. The usual purpose for specific drilling agents is given in Table IV.A.5.a-1.

As pointed out, drilling mud has a variety of purposes. Because each well hole will have its own unique characteristics that will have to be controlled, the estimate of individual components is impossible. Table IV.A.5.a-2 shows drilling mud programs currently required by operation on the San Pedro shelf area and the Santa Barbara area. Although the mud programs for the central and northern California offshore area may be similar to those mud programs currently used in southern California, the specific mud programs for central and northern California cannot be listed until drilling is initiated on the OCS shelf.

Discharges of drilling mud must comply with requirements found under OCS Order No. 7 and the National Pollutant Discharge Elimination System (NPDES) permitting procedures. Both of these requirements restrict the discharge of any drilling mud containing oil. The U.S. Geological Survey, Conservation Division, states if any oil base mud is used, the mud would not be released to the ocean, and cuttings would be cleaned or barged to shore for disposal. Currently, the only mud components used to make up drilling mud that must be registered with the Environmental Protection Agency are bacteriacides (Robichaux 1976).

Discharge of Formation Water. Formation water or oil field brine is recovered along with oil during petroleum production. The formation water is derived from water that was laid down interstitially with the sediments in the geological past. During the compaction, some of this interstitial water (connate water) was displaced from the resulting formation to form formation water. Consequently, formation waters reflect their environment of deposition.

After separating oil from formation water, the formation water may be disposed of by injecting into disposal wells, reinjected into producing wells, discharged into the marine environment, or a combination of these three disposal methods. Traditionally, southern California OCS formation waters have been discharged into the marine environment.

Under EPA effluent limitations (CFR 1975), "...the design of formation and other wastewater disposal systems will limit the oil content of discharged effluent to a maximum of 72 mg/l for any one day, and a 30

TABLE IV.A.5.a-1

DRILLING MUD TYPES AND RESPECTIVE COMPONENTS OF
RECENT (1976 ((Late)) TO 1978) PRACTICES
ON SOUTHERN CALIFORNIA OCS

OCS Area	Mud Type	Components	Lbs/42 Gal. bbl ^a
<u>San Pedro (OCS)</u>			
<u>Depth</u>			
0-800'	Sea water	Sea water	
900-1,600'	Gel/Salt water	Bentonite Salt Lignosulfonate Caustic Soda Barite	20 PPB 7 3 0.5 1
1,600-4,600'	Gel/Salt water (treated)	Bentonite Salt Lignosulfonate Caustic Soda Barite Lost Circulation Material Drispac (CMC)	20 7 5 1 80 10 1
<u>Dos Quadros (OCS)</u>			
0-350'	Sea water	Sea water	
350-1,200'	Salt Gel	Injection water Attapulgitic Clay Caustic Soda Bicarb	(11,000 PPM Cl) 10-12 PPB >0.5 PPB >0.5 PPB
1,200-3,000'+	Gel/Water	Injection water Bentonite Drispac Caustic Soda XMDL (Surfactant)	10+ PPB 1 PPB >0.5 PPB 1-2 PPB
<u>Oakridge (OCS)</u>			
0-200'+	Sea water	Sea water	
200-400'	Gel/Water	Bentonite Lignosulfonate Caustic Soda Soda Ash	25 PPB 2 PPB >0.25 PPB >0.5 PPB
400-3,500'	Gel/Water (treated)	Bentonite Lignosulfonate Caustic Soda Soda Ash Barite	20 PPB 4 PPB 1 PPB >1 PPB 60 PPB
3,500-5,000'	Gel/Water (treated)	Same as above + Barite	65+ PPB
5,000-8,000'	Gel/Water (treated)	Same as above + Barite + Poly Rx + Defoamer + Lost Circulation Material	100-120 PPB 1-2 PPB - 5-10 PPB
8,000'	Perforating Fluid	Calcium Chloride	110-120 PPB
5,000-8,000'	Minimum Solids Non-Dispersed	Same as above + Barite	180-200 PPB

^aOne pound per barrel. Metric equivalent is 2,449 mg/l.

Source: (Lloyd 1978).

TABLE IV.A.5.a-2

MATERIALS AND THEIR USE IN DRILLING MUDS

Material	Usual Purpose
<u>Gelling and Suspending Agents</u>	
Bentonite (Sodium montmorillonite clay)	Provide gel properties
Attapulgit (a clay mineral)	Provide gel properties in very high salinity fluids and to overcome loss of circulation
Acrylic polymers	Increase thickening properties of bentonite
<u>Thinners and Filtration Control Agents</u>	
Chrome lignosulfonates	Thinner (deflocculant) and filtration control agent
Lignites	Thinner and filtration control agent, usually at high temperatures (<300°F)
Tannins including quebracho	Thinner for fresh water muds at lower temperatures (<250°F)
Sodium acid pyrophosphate (SAPP) and other complex phosphates	Thinner (deflocculant for fresh water muds at lower temperatures (<250°F), treatment for cement or anhydrite contamination
Pregelatinized starch	Filtration control
<u>Density Control Agent</u>	
Barite (BaSO_4)	Increase mud density
<u>pH and Other Ion Control Agents</u>	
Caustic soda (sodium hydroxide)	pH control
Soda ash (sodium carbonate)	Remove Ca^{++} (anhydrite) contamination by precipitating CaCO_3
Sodium bicarbonate	Treatment for cement contamination
Lime	pH control and Ca^{++} control
Sodium chromate	Improve high temperature (<300°F) thinning action of lignosulfonates and lignites
Sodium chloride	Salinity control in very special purpose muds
Calcium chloride	Salinity control in very special purpose muds
<u>Organic Specialties</u>	
Surfactants	Improve flow properties
Defoamers	Improve flow properties, minimize density variations
Bactericides	Protect organic additives from microbial decomposition
Corrosion inhibitors	Protect metal parts

Source: Adapted from Gray 1970.

consecutive day average not to exceed 48 mg/l..." During initial oil production, formation water volumes will represent a very small fraction of total fluid extracted from the well, with oil composing almost the total amount of fluid. As the oil reservoir is depleted, the ratio of formation water to total extractable fluid increases. An estimate of the ratio of formation water to be produced per barrel of oil, on the life of the well, is as follows:

<u>Year</u>	<u>Bbl Water/Bbl Oil</u>
1st year	0.005
3rd year	0.025
10th year	0.266
15th year	0.563
20th year	1.041
25th year	1.941
28th year	3.000

Formation water volume estimates, for each sale area, are shown in Table I.B.2.d-2. Over the first 20 years of production, a total of 168 million barrels of oil are estimated (most probable) to be withdrawn from the tracts within the proposed sale area.

Dissolved elements and their respective concentrations within the formation water will depend upon which formation the oil field is in contact with. Some fields in Texas produce almost pure water, whereas in Michigan field-produced brines contained 624 parts per thousand (ppt) mineral salt. Based on a small amount of data, the oil field brines (formation waters) of the California coastal region, range from 22 ppt to 40 ppt mineral salts. The most common chemical constituents found in formation waters are iron, calcium, magnesium, sodium, bicarbonate, sulphates, and chloride. In addition to these chemical constituents, formation waters contain entrained oil or petroleum hydrocarbons, numerous trace elements, and an absence of dissolved oxygen.

Table IV.A.5.a-3 shows a detailed inventory of chemical and physical parameters that were found in the formation water of the Phillips Petroleum Company, La Conchita Plant (formation waters from Santa Barbara Channel). Since the properties given in Table IV.A.5.a-3 are for formation water from outside the proposed lease area, the table can only be used as a guide to show the characteristics of California OCS formation water. The range of chemical constituent concentration found along the California coast are shown in Table IV.A.5.a-4.

Sewage. The estimated annual discharge of sewage from proposed oil and gas activity is shown in Table I.B.2.d-2. OCS Order No. 8 states "following sewage treatment, the effluent shall contain 50 ppm, or less, of suspended solids, and shall have a minimum chlorine residual of 1.0 mg/liter after a minimum retention time of 15 minutes. The daily

TABLE IV.A.5.a-3

TYPICAL CHARACTERISTICS OF EFFLUENT FROM WATER TREATMENT FACILITIES

Phillips Petroleum Company
OCS P-0166 Lease - La Conchita Plant

Physical Properties		Chemical Properties, mg/l	
pH	7.3	Aluminum	2.2
Specific Gravity	1.02	Ammonia, N	39.7
Turbidity	12 JTU	Arsenic	0.001
Total Dissolved Solids (Calc.)	40,400 mg/l	Barium	0.
Total Solids	20,990 mg/l	Bromide	183.8
Total Volatile Solids	1810 mg/l	Cadmium	0.030
Total Suspended Solids	56 mg/l	Chromium	0.020
Settleable Solids	0.1 mg/l	Copper	0.116
Floatable Solids	0.3 mg/l	Cyanide	0.004
Temperature	77°F 25°C	Fluoride	1.7
BOD, 5-day	450 mg/l	Iron	1.35
COD	691 mg/l	Lead	0.28
Specific Conductance	31,630 m-mhos/cm		
Max. CaSO ₄ Possible (Calc.)	0. mg/l	Magnesium	50.0
Max. BaSO ₄ Possible (Calc.)	0. mg/l	Manganese	0.062
Alkalinity as CaCO ₃	3480 mg/l	Mercury	0.0005
		Nickel	0.29
<u>Dissolved Solids</u>		Nitrate, N	0.0
<u>Cations</u>		Nitrate, N	0.000
Total Hardness	10 me/l	Kjeldahl Nitrogene	54.6
Sodium, Na ⁺ (Calc.)	15,000 mg/l	Phosphorus-Ortho, P	1.54
Calcium, CA ⁺⁺	80 mg/l	Phosphorus, P	1.89
Magnesium, Mg ⁺⁺	72 mg/l	Silver	0.030
Iron (Total), Fe ⁺⁺⁺	1.0 mg/l	Zinc	0.18
<u>Anions</u>		Phenolic Compounds	2.10
Chloride, Cl ⁻	21,000 mg/l	C6115011	
		Identifiable	
Sulfate, SO ⁻	0. mg/l	Chlorinated	None
Carbonate, CO ₃	0. mg/l	Hydrocarbons	
Bicarbonate, HCO ₃ ⁻	4,270 mg/l	Radioactivity	
		Gross Alpha	
		Activity	None
Hydroxyl, OH ⁻	0. mg/l	Gross Beta	Detected
		Activity	None
Sulfide, S ⁻	1.1 mg/l	Oil and Grease	Detected
			5.0
<u>Dissolved Gases</u>			
h ₂ S	0.4 mg/l		
CO ₂	320 mg/l		
O ₂	0.3 mg/l		

TABLE IV.A.5.a-4

CALIFORNIA OFFSHORE PRODUCED FORMATION WATER
Constituents Range^a

Formation Water Constituent	Concentration (mg/l)
Salinity (Total dissolved solids)	21,700 - 40,400
Suspended solids/turbidity (Untreated water)	30 - 75
Oxygen Demand	
BOD (5-day)	370 - 1,920
COD	340 - 3,000
Oil and Grease	56 - 359
Trace Contaminants	
Arsenic ^a	0.001 - 0.08
Cadmium	0.02 - 0.18
Total Chromium	0.02 - 0.04
Copper	0.05 - 0.116
Lead	0.0 - 0.28
Mercury	0.0005 - 0.002
Nickel	0.100 - 0.29
Silver	0.03 -
Zinc	0.05 - 3.2
Cyanide	0.0 - 0.004
Phenolic Compounds	0.35 - 2.10

Source: EPA, 1974.

^aSome data reflect treated waters for reinjection.

NOTE: Due to the limited data from California offshore wells, these values represent estimated constituent values.

volume of sewage that will be discharged within each of the proposed areas will range from 2,000 gallons/day to 36,000 gallons/day. Sewage discharge was estimated as 100 gal/day/person on the platform.

Hydrocarbon Discharges. Hydrocarbons may be discharged into the marine environment as a result of accidental spills from episodic or occasional massive emission events. The volume of oil which enters the marine environment will depend on the type of accident and is very difficult to predict. Once the oil enters the ocean a variety of physical and chemical processes act to disperse the oil slick including spreading, evaporation of the more volatile constituents, dissolution into the water column, emulsification of small droplets, agglomeration and sinking, microbial modification, photochemical modification and biological ingestion and excretion. The rates at which the oil is removed from the ocean will depend on water temperature, current movements which may spread dissolution, wind speed which may aid evaporation and physical mixing by wind waves. A more complete discussion of these factors is found in Malin (1977) and Wolfe (1977).

In addition to the larger spills from rare accidents, some oil is expected and observed around drilling and production operations. These volumes are probably less than one barrel per day, resulting from small amounts of oil remaining on cuttings, after washing, small amounts spilled when hoses are uncoupled and amounts accidentally discharged from work boats. It should be noted that production platforms are provided with below deck pans and tubing to catch and funnel small amounts of oil which may be related to the drilling equipment for proper disposal onshore. These small amounts of oil are sometimes seen as a sheen on the water near the platform, dissipate within several meters to several hundred meters and are generally considered an insignificant input of hydrocarbons.

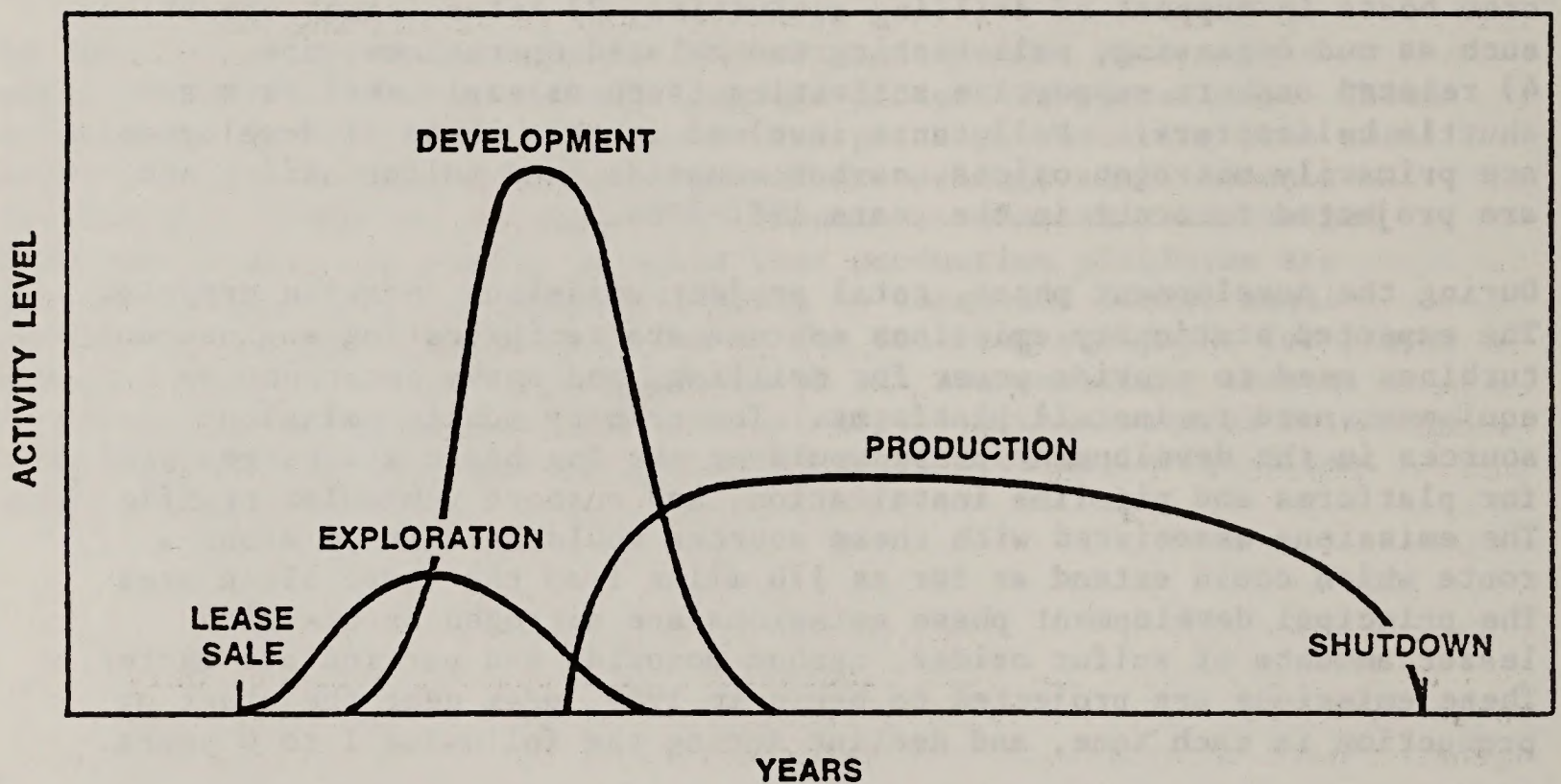
b. Air

i. Sources of Air Emissions: There are seven major air pollutants for which standards have been set to protect public health and welfare. In this section, the emissions of these six of these regulated pollutants are discussed for each phase of OCS activity. (The seventh, lead, is not considered an OCS development-related pollutant.) Figure IV.A.5.b.i-1 shows how economic activity level varies with time during different phases of OCS oil and gas development. Estimates of pollutant emissions for each of the Sale No. 53 lease block zones shows that emissions are expected to vary in proportion to the level of OCS activity. Thus, Figure IV.A.5.b.i-1 indicates the relative magnitude of OCS emissions projected during the course of OCS development.

Emissions during the exploration phase are produced by 1) power generating equipment needed for drilling, 2) tug boats, supply boats and crew boats in support of drilling activities, 3) intermittent operations such as mud degassing, well testing and related operations, and 4) related onshore supportive activities (such as employees' cars and shuttle helicopters). Pollutants involved in this phase of development are primarily nitrogen oxides, carbon monoxide, and sulfur oxides and are projected to occur in the years 1981-1984.

During the development phase, total project emissions increase greatly. The expected stationary emissions sources are reciprocating engines and turbines used to provide power for drilling, and heavy construction equipment used to install platforms. The primary mobile emission sources in the development phase would be the tug boats and barges used for platforms and pipeline installation, and onshore vehicular traffic. The emissions associated with these sources would be emitted along a route which could extend as far as 170 miles from the lease block area. The principal development phase emissions are nitrogen oxides with lesser amounts of sulfur oxides, carbon monoxide and particulate matter. These emissions are projected to begin in 1985, peak near the start of production in each zone, and decline during the following 1 to 6 years.

As indicated in Figure IV.A.5.b.i-1, total pollutant emissions projected during the production phase would be lower than during development. Principal stationary emission sources of nitrogen oxides during the production phase are turbines used to generate power for gas compression, oil pumping, water injection, etc. The major short term source of reactive hydrocarbon (volatile, organic compounds, or VOC) emissions during the production phase is from tanker loading/ballasting operations. Potential onshore tankering emissions would occur either in San Francisco or the Los Angeles area (or in Galveston, Texas for Scenario No. 3). Tankering emissions occurring in either Los Angeles or San Francisco were considered as a part of the inventory for the resource zone in which the oil was produced. A significant amount of



Source: Modified from Offshore Oil Development on the Georges Bank, CONOCO, 1976.

Figure IV.A.5.b.i-1 Relative Activity Levels During Phases of Offshore Development

VOC emissions are also produced from oil/water separators, pump and compressor seals, valves, and gas processing operations and onshore storage tanks. On an annual basis, gas processing plants are the principal source of VOC emissions. Other emissions sources during the production phase include exhaust emissions from tanker and barge engines (sulfur dioxide, nitrogen oxides, carbon monoxide) gas processing plants (sulfur dioxide, hydrogen sulfide, and nitrogen oxides), and onshore transportation systems (nitrogen oxides, VOC, and carbon monoxide). Total air pollutant emissions would gradually decrease as oil production declines in each tract zone.

ii. Sale No. 53 Emissions Inventory: A complete emissions inventory of the sources described above was prepared as a part of the Sale No. 53 Air Quality Study (POCS Reference Paper No. 53-5). The analysis is intended to estimate conservatively the relative magnitude and distribution of emissions from proposed Lease Sale No. 53 activity. The emission projections have been based upon USGS mean resource estimates for each of the five proposed lease tract areas. Because of large uncertainties involved in estimating the quantities of resources and scope of planned development, the results should be regarded as rough approximations.

In the development of the emissions inventory, mobile sources such as ships, barges, and tugboats contributed significantly to the totals for each pollutant. No additional mitigation measures were assumed beyond those normally used by industry or mandated by existing regulations. Emission limitations on OCS sources, which DOI promulgated in final form on March 7, 1980, were considered in this analysis. These regulations specify emission limitations on each source to prevent significant onshore impacts. The department will require additional controls on sources that may cumulatively have a significantly impact. Because the specific information on these additional controls is not currently available, they have not been included in this analysis. The mitigating effect of the proposed California OCS air regulations which DOI proposed on March 7, 1980 have not been considered. For onshore sources, only those pollution controls legally required by state and local regulatory agencies have been assumed. In Reference Paper No. 53-5, details of the assumptions used in the development of this inventory are presented. The reference document also contains projections of the maximum expected daily and hourly emissions of the mean resource estimates along with the annual emissions for the 5% and 95% resource estimates. In general, total annual emissions are roughly proportional to the USGS resource estimates.

Tables IV.A.5.b.ii-1 through IV.A.5.b.ii-6 present total annual emissions associated with peak emission land peak production years for each of the six pollutants, each OCS zone and each BLM transportation scenario. From the tables, it can be seen that of all pollutants VOC and nitrogen oxides are emitted in the largest quantities followed by

TABLE IV.A.5.b.ii-1

MAXIMUM HYDROCARBON EMISSIONS ASSOCIATED WITH SALE NO. 53 OCS GAS AND OIL DEVELOPMENT ---
MEAN RESOURCE ESTIMATE

(TONS/YEAR)¹

Proposed Zone	Peak Emission and ₂ Production Year	Transportation Scenario 1 (Tanker-Pipeline Mix)	Transportation Scenario 1-A (Onshore Gas Processing)	Transportation Scenario 2 (100% Tankering)	Transportation Scenario 3 (100% Tankering)
Eel River	1987	2,402	2,402	2,402	2,402
Pofint Arena	1989	2,721	2,721	2,721	2,622
Bodega	1987	194	194	194	133
Santa Cruz	1990	1,753	1,757	2,490	1,957
Santa Marla	1991	5,941	5,958	6,880	6,651

1. Refer to Section V.D. for more detail on the relative magnitude and location of the various emission sources contributing to the total emissions presented for each transportation scenario.

2. Peak emissions of hydrocarbons are expected to occur during the peak production year.

TABLE IV.A.5.b.11-2

MAXIMUM NITROGEN OXIDE EMISSIONS ASSOCIATED WITH SALE NO. 53 OCS GAS AND OIL DEVELOPMENT --
MEAN RESOURCE ESTIMATE

(TONS/YEAR)¹
Peak Emission Year (Peak Production Year)

Proposed Zone	Year		Transportation			
	Peak Emission	Peak Production	Scenario 1 (Tanker-Pipeline Mix)	Scenario 1-A (Onshore Gas Processing)	Scenario 2 (100% Tankering)	Scenario 3 (100% Tankering)
Fel River	1985	1987	721(379)	721(379)	721(379)	721(379)
Point Arena	1988	1989	1,322(1,303)	1,322(1,303)	1,322(1,303)	1,281(1,257)
Bodega	1985	1987	730(256)	730(256)	730(256)	730(226)
Santa Cruz	1988	1990	1,314(631)	1,314(631)	1,346(686)	1,292(592)
Santa Maria	1989	1991	3,678(2,222)	3,678(2,222)	3,669(2,210)	3,579(2,098)

1. Refer to Section V.D. for greater detail on the relative magnitude and location of the various emission sources contributing to the total emissions presented for each transportation scenario.

TABLE IV.A.5.b.ii-3

MAXIMUM SULFUR OXIDE EMISSIONS ASSOCIATED WITH SALE NO. 53 OCS GAS AND OIL DEVELOPMENT --
MEAN RESOURCE ESTIMATE

(TONS/YEAR)¹

Proposed Zone	Peak Emission and Production Year ²	Transportation Scenario 1 (Tanker-Pipeline Mix)	Transportation Scenario 1-A (Onshore Gas Processing)	Transportation Scenario 2 (100% Tankering)	Transportation Scenario 3 (100% Tankering)
Eel River	1987	273	273	273	273
Point Arena	1989	668	668	668	429
Bodega	1987	50	50	50	66
Santa Cruz	1990	276	276	258	307
Santa Maria	1991	925	925	1,633	1,074

1. Refer to Section V.D. for greater detail on the relative magnitude and location of the various emission sources contributing to the total emissions presented for each transportation scenario.

2. Peak emissions of sulfur oxides are expected to occur during the peak production year.

TABLE IV.A.5.b.ii-4

MAXIMUM CARBON MONOXIDE EMISSIONS ASSOCIATED WITH SALE NO. 53 OCS GAS AND OIL DEVELOPMENT --
MEAN RESOURCE ESTIMATE

(TONS/YEAR)¹

Peak Emission Year (Peak Production Year)

Proposed Zone	Year		Transportation Scenario 1 (Tanker-Pipeline Mix)	Transportation Scenario 1-A (Onshore Gas Processing)	Transportation Scenario 2 (100% Tankering)	Transportation Scenario 3 (100% Tankering)
	Peak Emission	Peak Production				
Eel River	1987	1987	144(144)	144(144)	144(144)	144(144)
Point Arena	1988	1989	254(248)	254(248)	254(248)	254(248)
Bodega	1985	1987	135(65)	135(65)	135(65)	135(60)
Santa Cruz	1988	1990	310(174)	310(174)	313(179)	304(164)
Santa Maria	1989	1991	764(481)	764(481)	741(452)	737(448)

1. Refer to Section V.D. for greater detail on the relative magnitude and location of the various emission sources contributing to the total emissions presented for each transportation scenario.

TABLE IV.A.5.b.ii-5

MAXIMUM TOTAL SUSPENDED PARTICULATE EMISSIONS ASSOCIATED WITH SALE NO. 53 OCS GAS AND OIL DEVELOPMENT --
MEAN RESOURCE ESTIMATE

(TONS/YEAR)¹

Peak Emission Year (Peak Production Year)

Proposed Zone	Year		Transportation		Transportation		Transportation	
	Peak Emission	Peak Production	Scenario 1 (Tanker-Pipeline Mix)	Scenario 1-A (Onshore Gas Processing)	Scenario 2 (100% Tankering)	Scenario 3 (100% Tankering)	Scenario 3 (100% Tankering)	Scenario 3 (100% Tankering)
Est River	1985	1987	36(35)	36(35)	36(35)	36(35)	36(35)	36(35)
Point Arena	1989	1989	94(94)	94(94)	94(94)	80(80)	80(80)	80(80)
Bodega	1985	1987	36(16)	36(16)	36(16)	36(16)	36(16)	36(16)
Santa Cruz	1988	1990	70(47)	70(47)	70(47)	70(46)	70(46)	70(46)
Santa Maria	1989	1991	224(161)	224(161)	224(161)	223(158)	223(158)	223(158)

1. Refer to Section V.D. for greater detail on the relative magnitude and location of the various emission sources contributing to the total emissions presented for each transportation scenario.

TABLE IV.A.5.b.ii-6

MAXIMUM HYDROGEN SULFIDE EMISSIONS ASSOCIATED WITH SALE NO. 53 OCS GAS AND OIL DEVELOPMENT --
MEAN RESOURCE ESTIMATE

Proposed Zone	Peak Emission and Production Year ²	(TONS/YEAR) ¹			
		Transportation Scenario 1 (Tanker-Pipeline Mix)	Transportation Scenario 1-A (Onshore Gas Processing)	Transportation Scenario 2 (100% Tankering)	Transportation Scenario 3 (100% Tankering)
Eel River	1987	24	24	24	24
Point Arena	1989	22	22	22	22
Bodega ³	None	Neg.	Neg.	Neg.	Neg.
Santa Cruz	1990	17	17	17	17
Santa Maria	1991	57	57	57	57

1 Refer to Section V.D. for greater detail on the relative magnitude and location of the various emission sources contributing to the total emissions presented for each transportation scenario.

2. Peak emissions of hydrogen sulfide are expected to occur during the peak production year.

3. Due to predicted low gas resource estimates, no gas processing plant is anticipated for this zone. Therefore, the hydrogen sulfide emissions are assumed to be negligible.

sulfur dioxide, carbon monoxide, particulates, and hydrogen sulfide in descending order. Volatile organic compounds and to some extent nitrogen oxides are considered precursors to formation of photochemical smog (primarily ozone). The predicted impact of Sale No. 53 emissions on ozone and other air pollution concentrations is discussed in Section IV.B.

The highest total pollutant emissions are expected to be associated with the Santa Maria tracts, followed by Point Arena, then Santa Cruz. The smallest emissions projected would be related to the Eel River and Bodega tracts. Eel River VOC emissions are an exception to this general trend because of higher emissions related to gas processing plants (no oil production is expected from these tracts based on current resource estimates). Total Point Arena, Santa Maria, and Santa Cruz emissions are somewhat higher than indicated by resource estimates alone because of additional emissions associated with long distance tankering and supply vessel trips to San Francisco. For most pollutants the projected high peak year emission levels are due to the coincident occurrence of large scale development and high levels of production.

Generally, onshore emissions estimated for Sale No. 53 are about one percent (or less) of the total emissions for most of the pollutants, except in Scenario 1A. In Scenario 1A, where gas processing occurs onshore, onshore VOC emissions and nitrogen oxides may constitute a substantial portion of total annual emissions in Scenario 1A. For example, in the Santa Maria Zone during peak production year, annual onshore VOC emissions would comprise 78 percent of the total VOC emissions for that zone in that scenario. Onshore VOC emissions for the same year are less than one percent of the total annual emissions for Scenarios 1 and 3, and 1.3 percent in Scenario 2.

Total peak year emissions of VOC, NO₂, and SO₂ for the Santa Maria, Point Arena, and Eel River tracts are substantial when compared to existing onshore emissions of the same pollutant. Onshore emissions of these pollutants, particularly in rural areas of northern California, are low because of the lack of heavy industry and light vehicular traffic. The pollutants emitted from the Bodega and Santa Cruz tracts are small compared to the existing onshore Bay Area emissions.

Several additional observations can be made from analysis of Tables IV.A.5.b.ii-1 through IV.A.5.b.ii-6:

- Peak emission years, as well as peak production years, are projected to be different for the five proposed zones.
- Within each zone, peak emission years vary from one pollutant to another. Some pollutants, such as VOC, are primarily production-related and peak during the period of declining development combined with peak production (see Figure IV.A.5.b.i-1). Other pollutants (NO₂, CO, TSP) are mostly development related and occur during the peak development--early production phases. In the tables, the peak production year emissions for these pollutants are shown in parenthesis.
- Generally, emissions associated with Scenario 2 (100 percent tankering) are the highest and those associated with Scenario 1 (mixed mode) are the lowest.

6. Changes in Socio-Economic Activity: Oil and gas leasing activities potentially cause economic and social change to coastal regions as a result of direct and induced changes in economic activity. These changes may reasonably be expected to involve both social benefits and losses.

Social benefits occur if labor (and possibly land and capital resources) that were previously unemployed or underemployed are used to capacity and there is a net increase in earnings and income in the region. Conversely, certain social costs may be exacted if at the same time these economic changes cause social dislocations and decrease economic and social welfare in the region. The extent of both positive and negative impacts depends on the scope and nature of the action. Impacts from a project may be ameliorated if the coastal regions have the ability to plan for and assimilate possible changes in economic activity.

The degree to which an area is affected by economic change that might result from oil and gas development depends primarily on the size and nature of the existing supply of labor and other economic resources. The important socio-economic characteristics are current levels of employment and income, the availability of public and private services, the existing oil and gas infrastructure, and characteristics of the remaining resource base.

Economic impacts to coastal regions adjacent to proposed Sale No. 53 tracts have been derived from the Curtis Harris economic model. The Harris Model is an econometric quantification of many important economic variables on a multi-region, multi-industry basis.^a The model uses historic socio-economic baseline data (e.g., population, employment, private investment, industry income and output) for which comparable information is available for all counties in the U.S. Its central premise is that in an economy with many economic interdependencies, regional output changes cause changes in employment and income which, in turn, affect the regional demand for goods, labor, and capital. The model essentially evaluates the comparative advantages and disadvantages of counties in providing support for OCS exploration and development activities, and then distributes the potential impacts from the project among them. The relationships between expenditures in each sector (99 different sectors are used in the model) and employment, population growth, private and government income, as well as other variables are

^aA complete description of the data, estimating procedures, and relationships which exist within the model can be found in: Harris, Curtis C., Jr. The Urban Economies, 1985. Lexington, Mass: D.C. Heath & Co., 1973, and Harris, Curtis C., Jr. and Frank E. Hopkins, Locational Analysis: An Interregional Econometric Model of Agriculture, Mining, Manufacturing, and Services, Lexington, Mass: D.C. Heath & Co., 1972.

expressed as equations. The model takes input data (e.g., direct employment, investment, and government revenues for a particular OCS oil and gas project) and the many equations in the model are then solved simultaneously deriving the outputs. The model is first run with variables forecast endogenously and then rerun with variables set to predetermined levels. Impacts can then be measured by comparing the outputs. The model estimates changes in output in the various industrial, agricultural, and service sectors and the associated changes in employment, personal income, regional product, and population. The general socio-economic effects of oil and gas leasing are discussed in the following sections.

a. Employment: OCS development will generate both direct and induced employment. Direct employment refers to workers employed by oil companies and drilling contractors who are involved in OCS activities (e.g., operation of exploratory and development rigs, production platforms, and essential onshore functions such as manning processing plants). Direct employment then includes offshore and some onshore employees. Induced employment is generated by the spending of OCS-related wages and earnings. Employment of an induced nature will result in many sectors of the regional economy. Thus, the total impact on employment in an economy resulting from an increase in employment in the OCS-petroleum related sector results in a "multiplier" effect. Total employment is greater than the original increase of employment because a chain of secondary expansions of income and production are set in motion. Impact on employment includes this total cumulative effect. In a region where there is unemployment and/or underemployment, employment increases would be beneficial.

b. Population: Population increase may result if there is net in-migration to a particular area as a result of OCS development. Given the same level of expenditures, employment and population impacts will generally be smaller than would result from most other types of development because OCS-related activities are highly capital-intensive. Any potential impacts on population would mainly affect nearby coastal cities and towns in central and northern California counties. Population changes would more likely take place in areas near permanent or temporary onshore support facilities, and in areas where OCS construction (largely platform) activities take place. The population composition may also change as a result of the redistribution of employment.

c. Infrastructure and Public Finance: Changes in employment and population may change the existing economic base to a certain extent in some regions. Economic change and growth may create additional demand for public and private community services such as schools, health facilities, housing, law enforcement, fire protection, and public utilities. Additional public and private facilities may need to be planned for in advance of induced demand. Because there may be lags in the system, temporary shortfalls could possibly occur causing

crowding and congestion, decreasing aggregate public welfare. The extent of impacts would be lessened to the degree that an area has a large and diverse economic base.

While it is expected that expenditures for public services may rise in response to increased demand, public revenues will also rise due to an increase of the income, sales, and property tax bases. Depending on the particular coastal region, it is thus possible that changes in economic activities could generate either a potential temporary public fiscal deficit or surplus.

d. Economic Indicators: The Harris Model generates a number of relevant economic indicators useful in impact analysis. These include the effects of the proposed action on such factors as personal income, private investment, value added in particular sectors, and public expenditures. Section IV.B.6 quantifies the extent of change in these factors and allows determinations as to the extent of socio-economic impacts that would result from the proposed sale.

Any economic model, of course, attempts to represent the more important elements in the economic world. It, of course, cannot represent all of economic reality and, therefore, must strike some balance between detail and ease of understanding and workability. The Harris model is no exception and must sacrifice some detail so that it can represent certain more important elements in the economic system. The Model's structure is such that it may not adequately take into consideration all the specialized conditions within a county. For example, it does not take into account all the institutional controls or growth management policies of particular counties which affect the economic system. However, because these factors are outside the economic system generally, being subject to political and institutional factors, most any economic model would have difficulty in this area.

Additionally, the Harris model is an economic model: it takes into account the elements of a market system--production, wages, prices, and other general financial factors. It does not explicitly value the variety of externalities that go with any social activity, e.g., aesthetics. These factors, however, do not go unrecognized, and, in fact, the basic rationale of any EIS is that these factors should be recognized and placed in their proper perspective. Other sections of this EIS address these non-economic factors.

Finally, the Harris and other regional economic models necessarily require some aggregation of data included within the data base and in the output that is generated. The Harris model uses some 99 different industrial sectors. The industries that are grouped within a sector may, for example, have varying prices, employment, or production characteristics. The Harris model aggregates onshore and offshore development into the single industrial sector of petroleum mining. While there may be important differences in the characteristics of industries involved in onshore versus offshore petroleum development, there are undoubtedly more areas where common economic factors are operating. Therefore, the economic impacts that would be generated would not be significantly different. Aggregation is necessary in a model to make it manageable.

7. Environmental Hazards: Platforms, pipelines, and other oil and gas development related structures are designed to withstand lateral and vertical forces associated with geological, meteorological, and oceanographic phenomena.

The principal impacting environmental condition in the Pacific OCS is ground motion related to seismic activity and sediment instabilities (e.g., slumps and slides). In designing a structure capable of withstanding the forces attendant to those geologic impacts, any possible impacts from meteorologic and oceanographic conditions are more than compensated for (e.g., structures are normally designed to withstand a 100-year storm; in designing a structure to accommodate seismic activity in the Pacific OCS, a structural design capable of withstanding a 400-year storm is often created).

To determine the level of expected seismic activity in a given area, probabilistic ground accelerations are computed based on predicted magnitude of a seismic event, distance of site from fault, and possible attenuation or magnification of a seismic wave by sedimentation conditions at the site.

Sediment instability analysis is also conducted. This is accomplished primarily by identification of historic mass movement either into or from the site in question. In addition, the physical characteristics of sediments are studied to determine a liquefaction potential.

With respect to platform construction, stability is primarily a function of piling diameter and depth of penetration into the substrate. Design criteria can generally be established which effectively mitigate the impact from ground motion or sediment instability. However, the engineering necessary to maintain the structural integrity of an offshore structure may be prohibitive to development and necessitate an alteration of the proposed site selection.

In general, the principal means of mitigating hazards to pipelines due to geological phenomena is to choose a pipeline route free from topographic irregularities, active faulting, and/or areas of sediment instability. Pipeline burial offshore to a water depth of 70 m (200 feet) (or some other anchoring method) is required by DOT regulations (see Code of Federal Regulations, Part 195.246). This provides protection against damage caused by strong currents nearshore. In addition, the pipeline is generally weight-coated with concrete to ensure stability under 100-year storm conditions and to provide negative or neutral bouyancy as a protection against "floatout". Depending on depth and differential pressure changes, increased pipewall thickness is used offshore to provide additional weight and adequate collapse resistance.

In areas of mobile sediments, burial in a firmer stable substrate is desirable. If emplacement in mobile sediments is unavoidable,

positioning the pipeline length parallel to the trajectory of sediment motion is a means to minimize stresses induced by a slump or slide.

In areas of active faulting, one technique to limit damage due to ground motion is to keep the pipeline as flexible as possible in order to accommodate shifts in the sea floor.

8. Alternative Development Scenarios: The development scenario considered the most probable (No. 1) was outlined in Section I.B.2 as part of the Description of the Proposal. Scenario No. 1 involves both pipeline and tankering transport of the hydrocarbon resources. However, certain development variations are possible. These center on possible alternative means of transporting the OCS resources to shore. This section will discuss three alternative transportation scenarios. A more complete discussion of all transportation scenarios is found in Pacific OCS Reference Paper No. 53-1. Section IV.B discusses the differing impacts that would result from these transportation alternatives on the various resource categories. Generally, the impacts would primarily be in terms of oil spills and air quality. Table IV.A.1-7 summarizes oil spill impacts under the alternative transportation scenarios. Section IV.B.1.a discusses impacts on air quality that would result from the various oil and gas transportation modes.

The first alternative transportation scenario is actually a slight variation of that presented in Section I.B.2.c and is therefore identified as No. 1A. Transportation route for No. 1A is the same as No. 1 except as follows: 1) Eel River - gas processing plant is located about 4 miles inland along the No. 1 pipeline route; 2) Point Arena - offshore gas pipeline is about 22 miles long and connects with onshore gas processing plant which is located about 2 miles inland near Manchester. Onshore pipeline follows State Highway No. 253 for about 35 miles and ties in with existing 12-inch pipeline near Ukiah; 3) Santa Cruz and Santa Maria - oil and gas processing plants are located about 2 miles inland along the No. 1 pipeline route.

The onshore processing plants could occupy the following areas: 1) Eel River - about 11 acres for gas processing plant; 2) Point Arena - about 9 acres for gas processing plant; 3) Santa Cruz - about 13 acres for oil and gas processing plant and two 50,000 barrel oil storage tanks; 4) Santa Maria - about 41 acres for oil and gas processing plant and two 170,000 barrel oil storage tanks.

Transportation Scenario No. 2 is the 100 percent tankering to California refineries alternative. Scenario No. 2 thus involves the following. Oil and gas transportation for the Eel River, Point Arena, and Bodega areas is the same as outlined in Scenario No. 1. The Santa Cruz and Santa Maria areas involve transportation changes. The gas from the Santa Cruz area is pipelined to shore as outlined in Scenario No. 1, while the oil is transported about 56 nautical miles in 100,000 barrel

barges to refineries in the San Francisco Bay area. The size of tankers entering the San Francisco Bay area is limited at the entrance to the Bay to 120,000 dead weight tons (dwt). The barge turn around time is 3 days. The gas from the Santa Maria area is pipelined to shore as outlined in Scenario No. 1, while oil is transported in 28,000 dwt tankers for about 174 nautical miles via Point Conception to Point Fermin sea lanes and then to the Ports of Los Angeles and Long Beach. Turn around time is also about 3 days.

Transportation Scenario No. 3 involves tankering transport of oil to the Gulf Coast region. Gas transportation in Scenario No. 3 is the same as No. 1. Oil from the Point Arena, Santa Cruz, and Santa Maria areas is transported by 45,000 dwt tankers to the Gulf via the Panama Canal. Oil from the Bodega area is transported in 25,000 dwt tankers. Maximum tanker size that can pass through the Panama Canal is 45,000 dwt, fully loaded. Each tanker would take between 27 to 29 days of turn around time. The distance from the marine terminal to Galveston, Texas is between 4,400 and 4,738 nautical miles. Other Gulf ports, such as Houston, Freeport, and Lake Charles are also possibilities.

B. Probable Impacts of the Proposed Action

1. Impacts on Air and Water Quality

a. Air Quality: Effects of possible Sale No. 53 activities on onshore air quality levels have been estimated through the use of computer simulation modeling. The modeling is based upon the emissions estimates and available data on ambient air quality and meteorology. Complete details of the modeling input parameters and methodology are discussed in Reference Paper No. 53-5.

Two types of models were employed: 1) EPA approved Gaussian models for the inert pollutants (NO₂, SO₂ and CO); and 2) RAPT (Reactive Air Pollutant Transport) and IMPACT models for photochemically reactive pollutants such as ozone. RAPT is a trajectory-type model developed specifically for use on the OCS and near-shore areas. This model makes predictions of pollutant concentrations along a path determined by the wind flow. The IMPACT model was developed for use by the California Air Resources Board (CARB). IMPACT predicts concentrations on a regional grid.

Gaussian models can estimate concentrations within a factor of two when emissions and meteorological impacts are known with high precision. In general practice, results are much poorer and can be in error by an order of magnitude. Worst case analyses were used to minimize the likelihood that impacts will be underpredicted. The worst case assumptions for key analytical parameters are given below.

Impact Modeling Assumptions. The uncertainty in key parameters, such as locations, number of sources, emission rates, production schedules, routing of products, etc., has necessitated a worst case analysis. This method provides estimates of reasonably expected upper limits and reduces the likelihood that impacts will be underpredicted.

The major worst case assumptions used in this analysis are:

- Maximum emission rate developed by assuming simultaneous operation of likely OCS-related emission sources. The lowest degree of emission control required by DOI's National Air Quality Regulations was assumed for facilities on the OCS, while facilities on shore are assumed to meet Best Available Control Technology as required by the Local Air Pollution Control District. It should be noted that DOI is required to impose additional pollutant control requirements on sources that either individually or cumulatively cause exceedences of the DOI significance level or the air quality standards. No controls of this nature have been included in this analysis.

- Placement of all emission sources such that onshore impacts are maximized. OCS sources in the analysis were assumed at the 3-mile limit or aligned in such a way so as to maximize predicted onshore concentrations. Distance between sources was minimized.
- Adverse meteorological conditions including light wind speeds, direct pollutant transport toward shore, and limited mixing rate for short averaging time predictions.
- Most adverse combination of published stack and design parameters (i.e., stack height, gas temperature, effluent exit velocity, etc.).
- No absorption of NO_x and SO_x by the ocean surface is assumed even though some of these pollutants may become dissolved in water.

The combining of these worst case assumptions probably results in an overestimate of potential impacts. More refined impact evaluations will be prepared when detailed project-specific information is available. This evaluation cannot take place until the development plan phase. The intent of this worst case analysis is to identify potential problem areas and to evaluate possible cumulative impacts of Sale 53. It should be noted that for a typical situation Sale No. 53 impacts are expected to be much less than those discussed herein. Also, identified impacts are for the peak emissions year. Under the projected development scenario, emissions would decrease an average of nearly 50 percent within 5 years after the peak emission year.

Maximum Inert Pollutant Concentrations. The predicted maximum annual average concentrations for NO_2 , SO_2 and TSP (total suspended particulate) are presented in Table IV.B.1.a-1. As Table IV.B.1.a-1 indicates, the projected onshore gas plant which would service the Santa Maria zone, could exceed a designated PSD (Prevention of Significant Deterioration) limit (namely, the SO_2 limit of 20 micrograms per cubic meter) in the modeled peak emissions year. The concentration increments from the projected gas processing plants to service the Eel River, Point Arena, and Santa Cruz OCS zones may also be of concern with respect to PSD limits for SO_2 . Future ambient levels of TSP would be minimally increased by OCS activities. In the Santa Maria area, State and Federal AAQS for TSP are presently exceeded on an annual average basis; the proposed OCS activities, both offshore and onshore, would represent less than one percent exacerbation of an existing condition. The computed SO_2 concentrations from all combined Point Arena OCS activities could exceed the DOI significance limit of 1 g/m³ by 0.1 g/m³, or 10 percent. The total computed NO_2 levels also exceed the DOI significance level (1.0 g/m³) for the Eel River zone by 0.4 g/m³.

TABLE IV.B.1.a-1

SUMMARY OF HIGHEST COMPUTED ANNUAL AVERAGE ONSHORE CONCENTRATIONS¹

Zone	Highest Onshore Concentrations From						Estimated Future Attainment Status		
	Offshore Activities (Scenario 1, 2, & 3)			Onshore Gas Plant ² (Scenario 1A)			(Concentrations without Project/ Concentrations with Project) ³		
	NO ₂	SO ₂	TSP	NO ₂	SO ₂	TSP	NO ₂	SO ₂	TSP
Eel River	1.4 ⁴	0.43 ⁴	0.14 ⁴		12.6		B(ND/)	B(ND/)	B(45/45.1)
Pt. Arena	0.87 ⁴	1.1 ⁴	0.13 ⁴	12.3	13.0	1.2	B(ND/)	B(8/21)	C(ND/)
Bodega Bay	0.5 ⁴	Neg. ⁴	Neg. ⁴				B(47/51)	B(3/3)	B(50/50)
Santa Cruz	1.0	0.15	0.07	7.4	11.9	0.17	B(66/73)	B(3/15)	B(50/50.2)
Santa Maria	1.0	0.70	0.1	22.5	26.5	0.27	B(70/93)	B(ND/)	A(113/113.3)
<hr/>									
National AAQS ⁵	100	80	75	100	80	75			
California AAQS ⁵			60			60			
PSD Increments ⁶		2,20	5,19		20	19			
DOI significance levels ⁷			1						

- Notes: 1. Concentrations are in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$), as calculated by the CDM model.
2. The gas processing plant is hypothesized under Transportation Scenario 1A. The Eel River Zone would only produce gas. The Bodega Bay zone would reinject all gas not used by offshore operating equipment. Concentrations listed are for the zone of highest impact which is very near the plant. The published stack and gas emission parameters used in this study assume a low stack height and low exhaust gas velocity which results in worst-case concentrations.
3. Letters indicate whether future annual average onshore concentrations, including the proposed OCS development, are expected to be in excess of AAQS (rated A), below AAQS (rated B), or too close to predict (C). The first figure within the parentheses shows maximum monitored annual average values; it is assumed that future concentrations without the OCS development would not exceed these values. The second figure is the sum of that highest monitored value and the highest expected OCS-related onshore concentration of that pollutant from either offshore or onshore activities. ND indicates no annual average data were available. In areas where no concern has been expressed for the pollutant in question (i.e., concentrations are believed, or known, to be minimal), the area is rated B for that pollutant. If short-average monitoring has reflected a high concentration, the area is conservatively rated C. These are extreme worst-case assumptions, and apply to the onshore area near the respective OCS zones, within a maximum of 20 miles of the coast. The reader is referred to Chapter VI of the technical report for further discussion.
4. These three zones were modeled using a worst-case assumption of concentrating all offshore emissions as a single emissions point. A more realistic geographical distribution of offshore emissions sources would reduce these computed concentrations by at least a factor of four.
5. National and California Ambient Air Quality Standards (AAQS), (primary standards).
6. US DOI maximum allowable increments. The increments are the maximum increase allowed by all projects in an area, provided the National AAQS are not exceeded. The smaller limits (2 for SO₂ and 5 for TSP) apply to the pristine Class I area of Ventana (Big Sur) off the Santa Cruz OCS zone. All other areas which could be affected by OCS activities are specified by the U.S. Environmental Protection Agency as Class II areas. US DOI levels apply to offshore emissions, whereas EPA's PSD levels apply to onshore emissions.
7. Proposed Department of the Interior (DOI) significance levels applicable to an onshore area in attainment of the national AAQS. Onshore areas not in attainment of the AAQS may not be impacted by OCS activities.

Maximum inert pollutant short-term average concentrations are presented in Table IV.B.1.a-2. It should be noted from this table (see columns headed "estimated future attainment status" and footnotes 4 and 9) that California's 24-hour standard for TSP is exceeded in four of the five onshore areas near the respective OCS zone. In these cases, OCS-related activities would minimally exacerbate the existing condition. In all five onshore areas the maximum OCS-related increase on TSP concentrations would be less than 6 percent of the standard.

The maximum NO₂ increment from OCS activities, when combined with existing pollutant loadings, could cause a violation of the NAAQS (National Ambient Air Quality Standards) in the onshore Santa Cruz area. This impact would result largely from ship effluent and construction equipment during platform installation, hence, is a temporary impact. In this worst case scenario, the ships and barges were assumed to cluster in a small area during the course of platform/OS&T (Offshore Storage and Treatment) installation at the 3-mile limit. There are two reasons this scenario is unlikely to occur: 1) the probability that all the ships and barges would be gathered together simultaneously at the 3-mile limit is small and 2) worst case meteorological conditions would have to occur in conjunction with this grouping of vessels. NO₂ impacts during a "worst case" production scenario would not endanger the air quality standard.

The short average concentrations from Sale No. 53 sources ranges from 1 to 19 g/m³ for SO₂ and H₂S and from 9 to 46 g/m³ for CO. These maximum SO₂, H₂S, and CO impacts, even when combined with existing pollutant levels, are expected to remain within the short-term standards. The impacts of any onshore gas processing plants on short-term pollutant concentrations are highly dependent on plant location and local topography and, thus, have not been modeled here. Recent air quality studies for similar type plants such as Exxon's proposed Las Flores Canyon facility in Santa Barbara County, have indicated that with state-of-the-art pollution control devices, air quality standards and PSD increments can be met.

Maximum Ozone Concentrations. The first task in the photochemical modeling was the selection of probable pollutant trajectories during worst case conditions. In general, the trajectories were selected on the basis of observed meteorological patterns during days of high measured ozone concentrations. In areas with limited meteorological data available, hypothetical worst case trajectories were constructed.

The constructed trajectories, and their associated meteorological air quality and non-OCS emissions data, were then modeled to generate an ozone baseline for comparison of simulated and observed ozone onshore. Modeling is in terms of 1-hour averages to correspond with the air quality standard for ozone. Baseline air quality and non-OCS emissions were then adjusted to account for anticipated conditions during the

TABLE IV.B.1.a-2

SUMMARY OF HIGHEST COMPUTED SHORT-AVERAGE ONSHORE CONCENTRATIONS¹

Zone	Concentrations and Averaging Periods					Estimated Future Attainment Status (Concentrations without Project/Concentrations with Project) ⁴			
	NO ₂		SO ₂		TSP	CO		NO ₂	SO ₂
	(1hr)	(1hr)	(1hr)	(3hr) ²	(24hr) ³	(1hr)	(8hr) ²	(1hr)	(24hr) ⁹
Eel River ⁵	112	10	10	10	5	6	43	43	43
Pt. Arena ⁵	283	11	11	11	6	6	43	43	43
Bodega Bay ⁵	40	<1	<1	<1	<1	1	9	9	9
Santa Cruz ⁵	283	10	10	10	5	5	46	46	46
Santa Maria ⁵	148	19	19	19	10	5	46	46	46
National AAQS ⁶			1300	365	150	40,000	10,000		
California AAQS ⁶	470	1310		131	100	46,000	10,000		
PSD increments ⁷			25,512	5,91	10,37				
DOI significance levels			25	5	5	2,000	500		

Notes:

1. Concentrations are in $\mu\text{g}/\text{m}^3$, as calculated for one-hour averages (or otherwise as noted) using the PT series of EPA-approved Gaussian Models (US EPA, 1978).

NO₂, TSP, and CO concentrations apply to all scenarios, with ships representing the principal emission source during platform installation. Highest SO₂ concentration on all zones, except Bodega Bay, are produced by Scenarios 1, 2, and 3 with support and crew ship emissions near a platform or OS & T being the principal emission source.

TABLE IV.B.1.a-2 (Cont.)

Notes:

2. The specified concentration equals the computed one-hour average concentration. This assumes that the wind holds steady throughout the specified averaging period, which is an unrealistic worst case.
3. The 24-hour average computed concentration assumes that the wind holds steady in speed and direction for 12 out of 24 hours, and emissions also hold steady for 12 hours. (During the remaining 12 hours the wind is assumed to shift offshore, or otherwise change direction).
4. Letters indicate whether future short-average onshore concentrations, including the proposed OCS development, are expected to be in excess of AAQS (rated A), below AAQS (rated B), or too close to predict (C). The first figure within the parentheses shows maximum monitored short-average values; it is assumed that future concentrations without the OCS development would not exceed these values. The second figure is the sum of that highest monitored value and the expected OCS-related onshore concentration of that pollutant for the comparable time period. ND indicates no comparable short-average data were available. In areas where available data indicate low concentrations, or no concern for the pollutant in question has been expressed, the area is rated B for that pollutant. If any reading has reflected a high concentration, the area is conservatively rated C. These are extreme worst-case assumptions and apply to the onshore area near the respective OCS zones within a maximum of 20 miles of the coast. (For example, concentrations were computed at the coastline; OCS-related NO₂ levels are expected to be considerably lower approximately 15 miles inland at the city of Santa Maria where the highest monitored one-hour value was 320.) The reader is referred to Chapter VI of the technical report for further discussion.
5. The maximum emissions case for NO₂, TSP, and CO represents a platform installation. Emissions result entirely from a derrick barge and other ships all congregated in the vicinity of the installation. Emissions are treated as from a single, steady fixed point source. Highest SO₂ emissions are from petroleum production scenarios.
6. National and California Ambient Air Quality Standards (AAQS).
7. US DOI maximum allowable increments. The smaller increments are for assessing the Ventana (Big Sur) Class I area near the Santa Cruz zone. See footnote No. 6 of Table IV.B.1.a-1 for additional details.
8. Proposed Department of the Interior (DOI) significance levels applicable to an onshore area in attainment of the national AAQS. Onshore areas not in attainment of the AAQS may not be impacted by OCS activities.
9. Incomplete ambient air quality data were available for the other short-term averages; refer to Chapter VI of the technical report for further discussion.

years of Sale No. 53 activities as documented in State Implementation Plan documents. Constructed cases of worst-case OCS emissions were then developed and appropriate OCS emissions introduced into the baselines and rerun. The difference in predicted ozone concentrations with and without Sale No. 53-related development represents the simulated ozone increment due to the proposed action.

Eighteen cases involving operational emissions were run. Ozone increments varied from none through 0.03 parts per million (ppm). Most increments were less than 0.01 ppm. Table IV.B.1.a-3 summarizes simulated baseline ozone, Sale No. 53 simulated ozone levels, and simulated points of maximum ozone concentrations. All cases assume worst-case meteorology insofar as it could be determined from available data. Highest ozone increments resulted from the hypothetical trajectories applied to modeling the North Coast. It is estimated that worst-case meteorology, as used in the study, can occur several times during the summer off each OCS zone.

Some of the future baselines used in determining incremental ozone from possible peak year Sale No. 53 activities are above State or national ozone standards. One modeling case represents a baseline just below the State 1-hour standard (0.1 ppm ozone) with the simulation resulting in ozone of 0.103 ppm. There were two similar cases relative to the national standard (0.12 ppm ozone). (The national standard must be exceeded twice within 1 year, however, to represent a violation.) In addition, one trajectory was run to determine any cumulative impact from previous OCS Sales 35 and 48 (Goleta Trajectory). That case showed an ozone increment of 0.01 to 0.02 ppm.

Conclusions

Sale No. 53 Impact. Sale No. 53 activities will probably not of themselves cause a violation of State or National Air Quality Standards.

Cumulative Impact. Incremental increases in NO₂ and TSP levels, when considered in combination with existing conditions, could violate or aggravate existing violations of the the Air Quality Standards. This would occur in some shore areas but both standards would not be exceeded in all shore areas. A small degree of additional emission control for NO₂ and TSP would prevent any possible violations of standards and would reduce the Sale No. 53 increment below levels considered significant.

Given these modeling results DOI would require additional NO₂ and TSP controls using the cumulative impact provisions of the DOI Regulations.

The cumulative impact of Sale 53 activities will not significantly aggravate existing ozone violations in the Bodega Bay and Santa Cruz areas. Sale 53 ozone increment in the Eel River and Point Arena areas are not sufficient to cause violations of the standards. The onshore areas adjacent to the Santa Maria tracts only marginally meet the

TABLE IV.B.1.a-3

SUMMARY OF OZONE IMPACT RESULTS¹

OCS Block	Trajectory	Peak Year Ozone Levels (1989-1992)				Simulated Location of Highest Concentration
		Future Concentration Without Sale No. 53	Future Concentration With Sale No. 53	Maximum Sale No. 53 Increment	Increment With Major Accident	
Eel River	Eureka	6	6-9	<3	8-14	Eureka, Humboldt City
Point Arena	Ft. Bragg	7	7-10	<3	0-13	Fort Bragg, Mendocino City
Bodega Bay	Bay Area 3	9	9-10	<1	1-2	10 miles NNE of Vallejo
	Bay Area 4	11	11	0	1	Mouth of Carquinez Straits
	Bay Area 5	12	12-13	<1	0-1	7 miles NNW of Vallejo
	Bay Area 7	9	9	0	0	Mouth of Carquinez Straits
Santa Cruz	Bay Area 1	14	13	0	0-4	Livermore and 15 miles west
	Bay Area 2	11	11-12	<1	-	Livermore
	Bay Area 6	20	20-21	<1	1	8 miles south of Saratoga
	Salinas	4	4	0	1	Salinas, Monterey City
	Monterey	3	3	0	2	10 miles ESE of Monterey
	Scott's Valley	15	15	0	0	Scott Valley, Santa Cruz City
Santa Maria	Nipomo	16	16	0	0-3	Shoreline WNW of Nipomo, San Luis Obispo City
4-66	Santa Maria	11	11-12	1	3	8 miles SW of Santa Maria, Santa Barbara City
	Santa Ynez	11	13	2	2-4	Santa Ynez
	Goleta	6	7-8	1-2	4-5	5 miles east of Goleta

1. Levels in parts per hundred million (pphm; 100 pphm=1 ppm) of ozone. California State, and national, 8-hour standards are 10 pphm and 12 pphm, respectively. These runs modeled various high emissions scenarios. Refer to Tables C-38 to C-42 of the report for a description of scenarios applicable to each modeling case. In general, tanker emissions at OS&T for Scenarios 1, 2, and 3 were stressed.
2. Cases were run using normal worst hour emissions rates, and others involving spills or blowouts. Accident cases have very low probability of occurring. The modeling further assumes concurrent worst case meteorology.
3. Maximum increments for the Eel River, Point Arena, Bodega Bay, and Santa Cruz areas were based upon emissions before application of controls mandated by the DOI air quality regulations.

federal ozone standard and this situation is expected to persist for some time. The ozone level increases in the Santa Maria area could increase concentrations above the Federal Standard. (The projected Sale No. 53 increment of 2pphm when added to the existing level of 11 pphm could violate the national standard of 12 pphm.) This in turn could limit future industrial growth because of strict pollution control requirements in areas exceeding the standard. Based upon this worst case scenario, it appears that significantly more stringent control of Sale No. 53 reactive hydrocarbon emissions would be required in the Santa Maria Basin in order to prevent violations of the ozone standard. The existing DOI air quality regulations require the Department to prevent any such violation of the National Air Quality Standards. Potential mitigation measures are discussed in the following subsection.

Other significant cumulative impacts include:

- Based upon projected low emissions of visibility reducing substances (mainly sulfates and its precursor SO₂), Sale No. 53 activities are not expected to significantly affect onshore visibility or odor levels. Odor levels should not be significantly affected since modeling results show H₂S concentrations well below the odor threshold.
- The combined emissions of all Sale No. 53 offshore sources could marginally exceed the annual average DOI "significance level" for NO₂ in the Eel River area and SO₂ in the Point Arena area. The 24-hour TSP significance level in Eel River and Point Arena and 24-hour SO₂ level in Santa Maria and Point Arena could, also, be exceeded. Given the modeling results discussed above, additional controls would be required by DOI to reduce concentrations below the "DOI significance level."
- Offshore CO, SO₂, and H₂S emissions will not cause violations of the air quality standards in any of the adjacent onshore areas.
- Construction and installation of platforms could temporarily cause a violation of the NO₂ standard in the onshore Santa Cruz area during periods with existing high NO₂ levels. Long-term activities would not cause violations of the standards.
- Impacts from onshore gas plants are highly dependent upon local topography. Preliminary analysis indicates a potential problem meeting the long-term SO₂ PSD increment. However, recent studies of similar plants equipped with state-of-the-art pollution control devices indicate that all applicable air quality standards can be met.

- A major oil spill during adverse meteorological conditions could have a significant impact upon ozone levels onshore for a short period after the spill.
- It should be noted that in our estimation for a typical situation, Sale No. 53 impacts will probably be much less than those discussed. Also, it is uncertain whether emission offsets ("trade-offs") will be available. Consumption of available onshore offsets by OCS sources could limit future industrial growth in areas where the standards are exceeded.

Potential Mitigation Measures and Effectiveness. This subsection presents potential mitigation measures for the projected worst case onshore impacts of Lease Sale No. 53. It should be noted that the impacts identified in this analysis are not predictions of actual impacts but are an indication of possible impacts.

In the preceeding analysis it was found that additional control for SO₂, NO₂ and TSP emissions would be required in some areas to prevent possible violations of the standards and to reduce Sale 53 increments below levels considered significant. Significantly more stringent control of Sale 53 reactive hydrocarbon (VOC) emissions in the Santa Maria basins would be required to prevent possible violations of the ozone standard. A variety of technological and operational control measures could be utilized to mitigate these onshore impacts. Potential mitigation measures for Sale 53 air pollutant sources are shown in Table IV.B.1.a-4. Some of these measures have, at the present time, not been fully demonstrated for use in offshore applications; some would be subject to economic and/or additional regulatory constraints. However, it is assumed that by the time peak construction and production operations are under way (mid to late 1980s) these measures could be employed.

With the implementation of the control measure outlined in Table IV.B.1.a-4 (assumed to be best available control technology), hydrocarbon emissions associated with platform operations, tanker/barge loading and gas processing could be reduced by 90 percent. Nitrogen oxide emissions from diesel-fixed turbines and engines could be reduced by approximately 60 to 70 percent if the listed control techniques were applied to both stationary and mobile sources. An overall 40 percent reduction of producing platform particulate emissions could be achieved by use of natural gas rather than diesel fuel for power generation. Based upon the additional degree of control required, the above measures appear to be sufficient to prevent onshore impacts which exceed the DOI significance levels. Should any of the above measures prove infeasible, an alternative mitigation measure would be the use of "emission offsets."

Any necessary controls such as those described above, would be required using the existing cumulative impact provisions of the DOI air quality regulations (30 CFR 205.57-1(J)). The regulations require additional controls on a facility that is exempt from controls by itself, but that in combination with other sources could significantly affect the air quality of an onshore area.

TABLE IV.B.1.a-4

POTENTIAL OCS LEASE SALE NO. 53 EMISSION REDUCTIONS BASED ON PROPOSED MITIGATION MEASURES¹

Emission Source	Pollutants of Concern ²		Potential Mitigation Measures	Estimated Percent Emission Reductions ³
	(Percent of Total Lease Sale No. 53 Emissions)			
1. Production Platform Activity	HC(9), NO _x (35), SO _x (30), CO(50), TSP(45)			
Power Generation	Major Pollutants (Percent of Platform Emissions) NO _x (92), SO _x (92), CO(92), TSP(94)		Use of natural gas as fuel Water heat utilization Water injection to turbines	NO _x (60), SO _x (95), CO(10), TSP(40)
Development Drilling	NO _x (8), SO _x (8), CO(8)		Waste heat utilization Water injection to turbines	NO _x (50), SO _x (10), CO(10)
Evaporative (fugitive) losses	HC(100)		Proper Operation and Maintenance	HC(75)
			PERCENT OF OCS LEASE SALE NO. 53 EMISSIONS REDUCED BY MITIGATION OF PLATFORM EMISSIONS	HC(07), NO _x (21), SO _x (26), CO(04), TSP(17)
2. OS&T (with tankers) Activity	HC(57), NO _x (58), SO _x (52), TSP(22)			
Gas Processing	Major Pollutants (Percent of OS&T Emissions) HC(60), SO _x (24)		Vapor recovery Proper Operation and Maintenance	HC(95), SO _x (75)
Tankers Loading	HC(38), SO _x (23)		Vapor balance line Use of low sulfur fuel	HC(90), SO _x (75)
Tankers in Sea Passage	SO _x (40)		Use of low sulfur fuel	SO _x (75)
			PERCENT OF OCS LEASE SALE NO. 53 EMISSIONS REDUCED BY MITIGATION OF OS&T EMISSIONS	HC(52), SO _x (34)
3. Onshore Gas Processing Plant Activity	HC(34), NO _x (9), SO _x (17)			
Storage Tanks	Major Pollutants (Percent of Gas Processing Emissions) HC (< 1)		Installation of floating roofs	
Oil Processing	HC (< 1), NO _x (12)		Waste heat utilization	
Gas Processing	HC (> 99), NO _x (88), SO _x (100)		Proper Operation and Maintenance Vapor recovery Waste heat utilization (elim. of direct-fired heaters)	HC(90), NO _x (90), SO _x (75)
			PERCENT OF OCS LEASE SALE NO. 53 EMISSIONS REDUCED BY MITIGATION OF GAS PROCESSING PLANT EMISSIONS	HC(31), NO _x (08), SO _x (13)
4. Support Activity	NO _x (51), CO(47), TSP(31)			
boats, barges)			Catalytic reactor, exhaust Gas recirculation, fuel injection retard	NO _x (70), CO(-), TSP(-)
			PERCENT OF OCS LEASE SALE NO. 53 EMISSIONS REDUCED BY MITIGATION OF SUPPORT ACTIVITY EMISSIONS	NO _x (36), CO(-), TSP(-)
			TOTAL PROJECTED OCS LEASE SALE NO. 53 EMISSIONS REDUCTIONS	HC(90), NO _x (65), SO _x (73), CO(04), TSP(17)

1. Emission sources and the percent of OCS Lease Sale No. 53 emissions that result from these sources are based on Table V-51 (Ref. Paper No. 53-5). The table is purposely general and is intended to present an overall indication of the relative Lease Sale No. 53 percent emissions reductions that could be achieved given application of the proposed mitigation measures.

2. For each major source (i.e. production platform, OS&T with tankers . . .) the relative percent of OCS Lease Sale No. 53 emissions they represent are presented. Under each major source are the specific operations (and the percent of emissions that contribute to emissions from the major source.

3. Estimated percent emission reductions for Lease Sale 53 are presented for each specific operation listed under each major source, for the major source as a whole and overall for OCS Lease Sale No. 53.

b. Impact on Water Quality: Many of the chemical and physical properties transferred to the ocean during oil and gas development and production represent waste that will degrade the water quality. The magnitude to which these wastes will reduce the water quality is not easily estimated. Based on available information, this section provides an estimate of the proposed sale impact on the water quality, i.e., the change in water quality as a result of the activities associated with the proposed sale.

Throughout oil and gas development and operation, water quality will be decreased by: 1) resuspension of sediment through exploration and development activities and pipeline construction, 2) daily sewage discharge, 3) formation water discharge, 4) drilling muds and cuttings discharge, and 5) hydrocarbon discharge through potential accidents.^a

Bottom sediments will be put suspension during exploration and development activities with the emplacement of re-reentry collars, blowout preventers, and the placement of drilling platforms or other sea-bottom equipment. Additionally, sediments will be suspended during pipeline construction and burial. The impacts that could result from resuspension of bottom sediments are increased turbidity and, from areas of pollutant rich sediment, the potential for pollutants to be mobilized into the water column, both discussed previously in Section II and below.

The magnitude and extent to which sediment will be put into suspension will be dependent on the bottom material type and grain size, prevailing water current and the duration of the activity. For most of the activities involved in positioning, anchoring and installing subsea equipment such as reentry collars and blowout preventers, the impact should be short-term involving turbidity increases over one or two days. Pipeline burial will likely involve much larger volumes of sediment over periods up to weeks and thus have a more significant impact in increasing turbidity. These turbidity increases would have nominal to zero impact on photosynthesis and productivity of phytoplankton except in the shallowest areas since the disturbance would be below the depth for most phytoplankton and would probably be confined to these depths by the thermal stratification which exists generally above 50 m for the California OCS area. Upwelling might be expected to bring turbid water to the surface and affect photosynthesis rates but this phenomenon is confined to the upper 200 m generally.

A concern over the possible mobilization of pollutants in sediments due to OCS activities has been expressed. Trace metals, except for mercury, as discussed in Section II will have minimal impacts on the higher trophic levels (Young and Mearns, 1978) and except under very specific conditions, are not easily dissolved from sediments into the water columns (Chen et al., 1974). Lower invertebrates such as benthic clams and polychaetes have been shown to accumulate high levels of tract elements in polluted environments (Bryan and Hummerstone, 1971; Marks

^aThe fate of hydrocarbons is discussed in OCS Reference Paper No. II (Oil Spill Risk Analysis of Proposed OCS Sale No. 53).

1938; Oshida, 1977; SCCWRP, 1973; numerous other references may be cited here), but areas with high concentrations of metals have not been found and are not expected in central and northern California with the exception of San Francisco Bay.

Mercury and the chlorinated hydrocarbons DDE and PCB have been shown to be bioamplified in fish at various trophic levels which inhabit areas off Palos Verdes in southern California where high sediment concentrations of these pollutants are observed (Young and Mearns, 1978). Whether this phenomenon is seen in the more stable components of crude oil such as the anthracenes and benz (a) pyrene remains an open question. Perturbations of sediment associated hydrocarbons due to OCS activities could bring fresh concentrations up to the surface of the sediments where they could be available to benthic organisms. Hawkes, (1977) has demonstrated tissue changes in two bottom fish, the starry flounder (Platichthys stellatus) and the English sole (Parophrys vetulus) exposed to a water soluble fraction of Prudhoe Bay Crude oil. A possible sediment to fish transfer route was not investigated and the question remains whether it is possible for these organisms to uptake hydrocarbons from sediments. This impact is not expected to be great for OCS effects on sediment given the amount of sediments which are expected to be disturbed (see Table I.B.2.d-2) for miles of pipeline and the potential for microbial degradation of sediment hydrocarbons (reviews by Karrick, 1977 and Gibson, 1977) reducing the probabilities of large surface sediment hydrocarbon concentrations as seen for the artificial chlorinated hydrocarbons in sediments near Palos Verdes, California. However, drill cutting washing practices may lead to extensive accumulations of naphthalenes, phenanthrenes and dibenzothiophenes in sediments near platforms as demonstrated by Grahl-Nielsen et al. (1980). They found extensive accumulations of these compounds in sediments up to 1 kilometers away from the platform. Thus a significant impact could develop in regard to new hydrocarbons being added to sediments by OCS activities.

Estimated sewage discharge for the Eel River area, Point Arena area, Bodega area, Santa Cruz area, and Santa Maria area is discussed in Section II.A.1. Sewage will be treated in accordance with OCS Order No. 7 as stated in Section IV.A.5.a. Sewage treated in accordance with OCS Order No. 7 should produce a negligible impact on the ocean water quality except in the immediate area of sewage discharge. The impact from sewage discharge will result from the residual chlorine that must be maintained to insure proper disinfection of the sewage. As a result of the residual chlorination, algae and bacterial growth will be inhibited. This impact will be limited to the immediate around the point of discharge.

Drilling mud used during drilling operations will be periodically or accidentally discharged into the ocean as described in Section II. Rates may vary from 10 to 50 barrels per hour from shale shaker excess to short-term discharges of 700 barrels per hour (400 barrels total over

30 to 35 minutes) from excess amounts of fluids displaced by generation from the formation (ECOMAR, 1978; Dames and Moore, 1978). Several studies have been done examining drilling mud plume dynamics and impacts in water quality from the discharges (ECOMAR, 1978; Environmental Devices Corporation, 1976; Dames and Moore, 1978; Ayers, Meek, Sauer and Stuebner, 1980; Ray and Meek, 1980). Generally, what these studies found is that drilling mud discharge has a local water quality effect that is attenuated at increasing distances from the point source. As mentioned in Section II, turbidity may decrease transmittance of light in the vicinity of the platform (generally within about 1,500 m, Ayers et al. 1980) thus reducing light available to phytoplankton and, therefore, temporarily reducing photosynthesis and primary productivity. To date, no studies have been found which address this question and the degree to which photosynthesis is reduced, if at all, is unknown. However, in light of the patchy distribution of phytoplankton (Dr. R. Pieper, USC, personal communication) and the transient nature of populations moving with the current around platforms, it is unlikely that any significant impacts will result from turbidity.

Although the ocean water affected by the drilling mud discharge may not acutely affect pelagic marine life, sublethal effects of pollutants may have important consequences within an ecosystem (Environmental Science and Engineering, 1976). Ultimately, the majority of drilling mud components settle to the ocean floor and could smother bottom biota.

Between the year 1981 and the year 1991, approximately 400,000 barrels of drilling mud and one million barrels of drill cuttings are estimated to be dumped as a result of the proposed lease sale. Estimated drilling mud total discharge quantities for each sale area is listed in Table I.B.2.d-2. The components and nature of drilling mud are described in Section IV.A.5.a.

The discharged drilling mud and cuttings will form a plume that will move away from the point of discharge in the direction of the current. The dilution of the drilling discharge plume is dependent on the type and characteristics of mud used, its discharge rate, the water depth, surface and subsurface currents and ocean physical characteristics. Ray and Shinn (1975) found that drilling fluid discharged at a rate of 40 bbl/hr, may be diluted by 1,000 to 1 (parts ocean water to parts discharged drilling fluid) in the direction of the prevailing current approximately 305 m (1,000 feet) from the discharge point. At a discharge rate of 250 bbl/hr, the discharged drilling fluid is shown to be diluted by 100 to 1, in the direction of the prevailing current approximately 305 m (10,000 feet) from the discharge point. The dilution ratios presented by Ray and Shinn for steady-state diffusion from a point source with a mixing depth of 75 m (245 feet) and a current speed of 15 cm/sec (0.29 knot) are shown in Figure IV.B.1.b.i-1.

Results of several of the studies mentioned above (e.g., Ayer et al., 1980; Ray and Meek, 1980; Zemel, 1980) indicate that, in several cases,

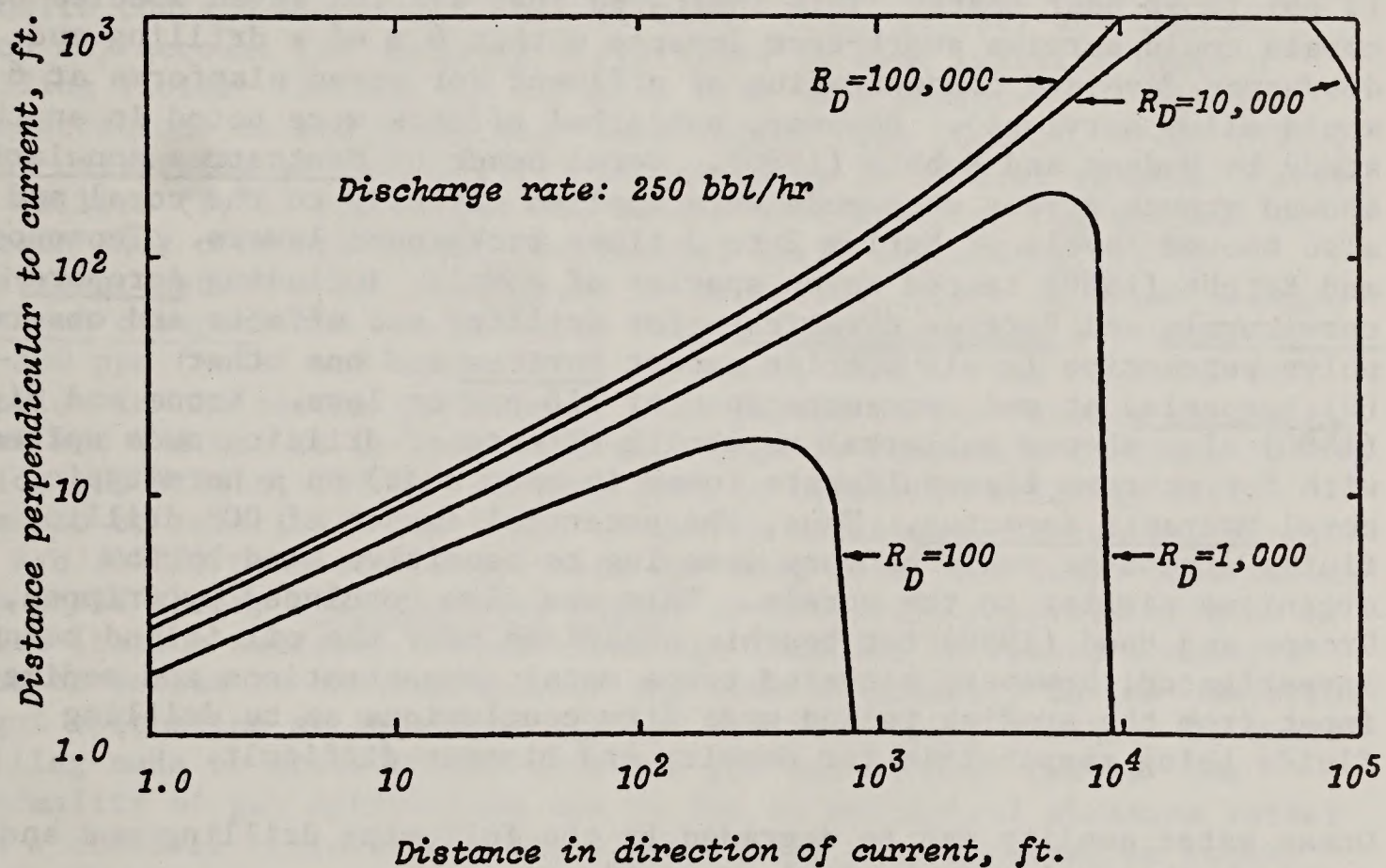
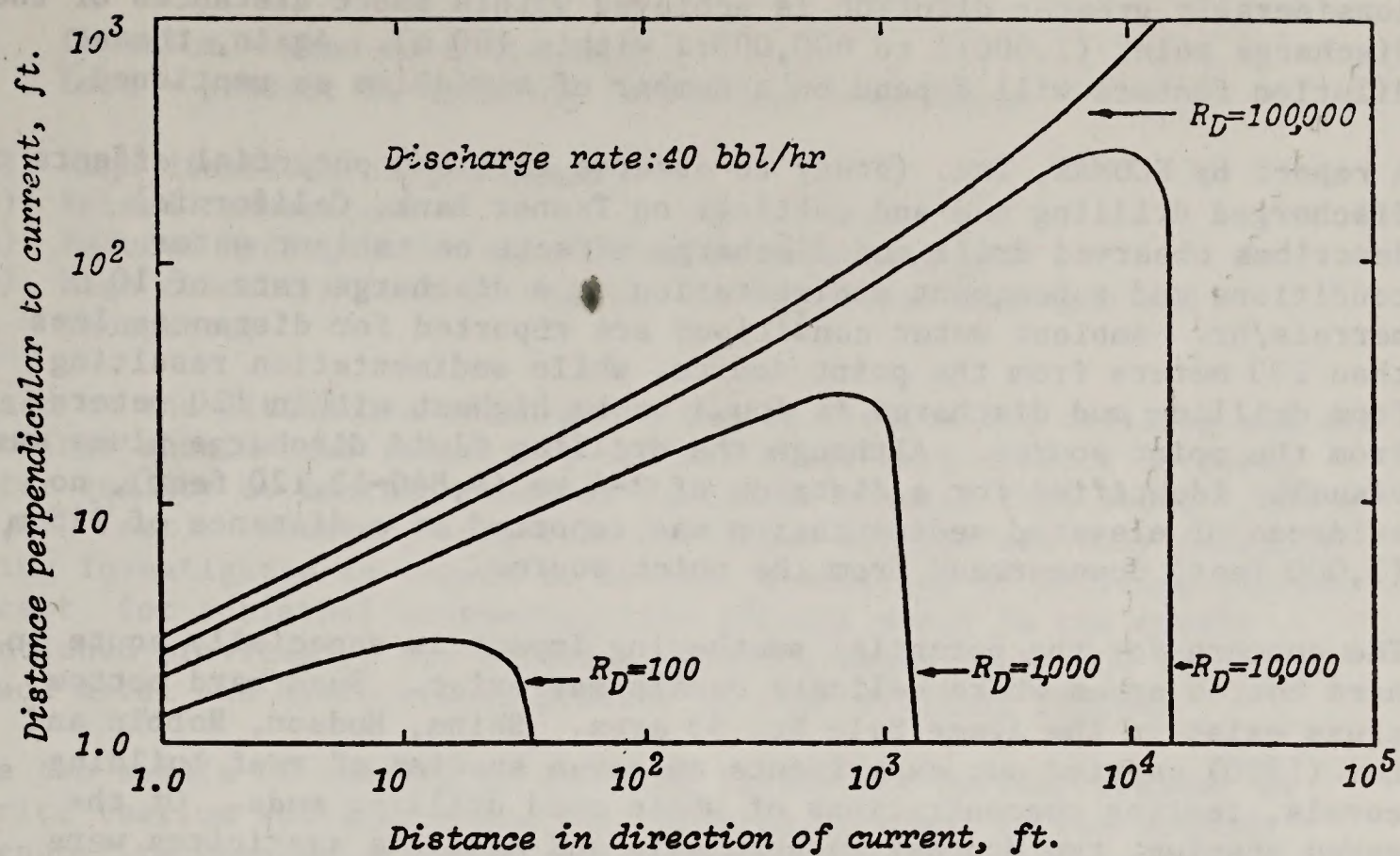


Figure IV.B.1.b.1-1 Dilution Ratios for Drill and Mud Discharged from a Point Source

Source: Ray and Shinn, 1975.

R_D = Volume sea water divided by discharge fluid

considerably greater dilution is achieved within short distances of the discharge point (1,000:1 to 600,000:1 within 100 m). Again, these dilution factors will depend on a number of variables as mentioned.

A report by ECOMAR, Inc. (study to observe fate and potential effects of discharged drilling mud and cuttings on Tanner Bank, California) describes observed drill mud discharge effects on ambient water conditions and subsequent sedimentation at a discharge rate of 10 barrels/hr. Ambient water conditions are reported for distances less than 200 meters from the point source, while sedimentation resulting from drilling mud discharge is found to be highest within 120 meters from the point source. Although the drilling fluid discharge plume was visually identified for a distance of 3-4 km (9,840-13,120 feet), no evidence of elevated sedimentation was reported at a distance of 915 m (3,000 feet) downcurrent from the point source.

The concern for the potential smothering impact is especially acute in hard bottom areas where delicate corals may exist. Such hard bottom areas exist in the lease Sale No. 53 area. Shinn, Hudson, Robbin and Lee (1980) carried out experiments on seven species of reef building corals, testing concentrations of whole used drilling muds. Of the seven species, two Montastrea annularis and Agaricia agaricites were killed by concentrations of 479 ppm and none were killed by 150 ppm or 11 ppm in 96 hour tests. This indicated that all the seven species of corals could survive short-term impacts within 6 m of a drilling mud discharge (average concentration of effluent for seven platforms at 6 m would allow survival). However, sublethal effects were noted in another study by Hudson and Robbin (1980). Coral heads of Montastrea annularis showed growth stress when muds were applied directly to the coral and also showed levels of barium 2 to 3 times background levels. Thompson and Bright (1980) tested seven species of corals, including Acropora cervicornis and Porites divaricata for drilling mud effects and observed polyp retraction in all species except Porites and one other (Dichocoenia) at mud concentrations of 316 ppm or less. Krone and Biggs (1980) also showed sublethal metabolic effects of drilling muds spiked with ferrochrome lignosulfonate (used in many muds) on a hermatypic coral Madracis decactus. Thus, the potential impact of OCS drilling fluids discharge could be very damaging to sensitive hard-bottom organisms similar to the corals. This was also concluded by Crippen, Greene and Hood (1980) for benthic organisms near the oil island being investigated; however, elevated trace metal concentrations and sediment input from the eroding island made firm conclusions as to drilling fluids being responsible for density and biomass difficult.

Ocean water quality may be degraded by the following drilling mud and cuttings chemical and physical properties:

(1) Increased trace metal concentration

Barium - used as a weighting material

Chromium - used as a dispersant

Lead - present in drilling fluids and lubricants

- (2) High dissolved oxygen demand
- (3) Raised temperature
- (4) Reduced hydrogen ion concentration (elevated pH)
- (5) High concentrations of organic carbon, total nitrogen and phosphorus

Based on the literature cited above and in Section II, drilling mud and cuttings should have relatively minimal short-term effects on ocean water quality or benthic fauna at distances greater than about 1,000 m (3,280 feet). However, long-term sublethal effects are only recently being investigated in regard to chronic discharges of drilling fluids. Except for sublethal smothering-like effects noted in the corals mentioned previously, the principal concern seems to be the impact of trace metal and hydrocarbons present in most drilling fluids.

The two metals of concern in drilling fluids are barium, present in barite (barium sulfate) clays and chromium, present in ferrochrome lignobarite (barium sulfate) clays and chromium, present in ferrochrome lignosulfonate muds. In addition to these two trace metals, some barite deposits contain elevated levels of lead, zinc, mercury and cadmium which may account for observed differences in some toxicity tests of drilling fluids. Barium and chromium have been measured in increased concentrations in sediments near exploration rigs (ECOMAR, 1978; SUSIO, 1976; University of Texas, 1977) in levels up to several thousand parts per million (2,763 ppm within 300 meters of a drilling rig outfall on Stetson Bank offshore Texas, Continental Shelf Associates, 1976). Hexavalent chromium has been shown to be acutely toxic to Brown Shrimp (Crangon crangon) and the European Cockle (Cardium edule) at levels of 100-300 ppm (McKee and Wolf, 1973; Portmann, 1972). The toxicity of chromium in the marine environment will depend on the valency of the metal and whether it is complexed with organic compounds (Oshida, 1977); Oshida and Wright, 1977). Barium, when it occurs in drilling fluids seems to be relatively non-toxic to marine organisms. Doughtie, Conklin and Rao (1980) conducted short-term and long-term (106 days) experiments with grass shrimp (Palaemonetes pugio) to determine possible effects of barite (barium sulfate). Their findings included increased concentrations of barium in the exoskeleton and some abnormality in the posterior midgut epithelium at levels of 100 ppm barite. Acute toxicity of whole drilling muds to grass shrimp were one ppt for 96 hour tests. The abnormality of gut epithelium may be due to mechanical abrasion rather than a chemical toxic effect since the shrimp were observed to ingest barite in test containers until the gut was visibly packed. McCulloch, Neff and Carr (1980) investigated the bioavailability of heavy metals to the clam Rangia cuneata and the oyster Crassostrea gigas. Their results indicated that clams could accumulate significant amounts of chromium in the digestive tract and much of this chromium was released to the environment when the clams were returned to clean sea water. The amount

of chromium uptake from a mud aqueous fraction (water soluble) was much less than from sediments. They concluded that the bioavailability of heavy metals in drilling fluids was very limited. These results may be contrasted with those by Crippen, Greene and Hood (1980) where mercury levels were elevated around a drilling island at distances of up to 1,800 miles down current. Mercury has been shown in numerous studies to be the most toxic of all the common trace metals (Waldichuk, 1974) and significant impacts to marine biota could result from muds contaminated with this metal. It should be pointed out, however, that the drilling muds used in this instance were apparently contaminated with unusually high levels of mercury and are not representative of fluids usually employed (based on comments from 1980 Symposium Research on Environmental Fate and Effects of Drilling Fluids and Cuttings January 21-24, 1980 Lake Bulena Vista, Florida). Impacts from drilling fluids from lease Sale No. 53 could, therefore, have significant long-term impacts if such contaminated fluids are employed in drilling. These types of impacts are not expected, however, and could be mitigated by monitoring and prohibiting use of contaminated muds.

Bactericides are frequently added to drilling fluids to inhibit bacterial breakdown of organic additives and to suppress hydrogen sulfide production. Sodium pentachlorophenate (Dowicide G) is used in drilling fluid at concentrations from 280-560 ppm (Robnichaux, 1975). The toxicity of chlorinated phenols is very high, 0.1 ppm for 24 hr LC₅₀ for freshwater fish (EPA, Washington, D.C. communication), and may also have a long half-life in the marine environment similar to DDT and PCB. The impacts of these compounds on marine organisms could be very severe in the vicinity of the rigs and platforms and in recognition of this, the U.S. Geological Survey published a Notice to Lessees and Operators (Federal Register, Vol. 24, No. 129, July 3, 1979) prohibiting the use of chlorinated phenols in OCS oil and gas operations after October 1, 1979. This still leaves open the potential impacts of other bactericides such as formaldehyde, paraformaldehyde and glutaraldehyde which are powerful protein fixatives. Given the initial concentrations of these mud components, up to 1,500 ppm (Cimato, 1980) and the dilution factors involved as discussed previously, the impacts on the marine environment should not be severe. The question, however, remains open.

Once oil production starts, formation water will be discharged into the ocean. Although the discharged formation water will be dispersed (diluted) as the water mass moves away from the point of discharge, the discharged formation water will change ambient ocean water quality near the discharge point. The main formation water characteristics that will affect ocean water quality are petroleum hydrocarbons (oil), numerous trace elements and an absence of dissolved oxygen. Also, radionuclides have been detected in produced formation waters in activity levels ranging from 4 to over 1,000 picoCuries per liter, while ambient radioactivity levels in continental shelf waters are approximately 1-2 picoCuries per liter. The constituent of greatest concern is radium which has been measured in produced waters from several Gulf of Mexico

wells in concentrations exceeding 300 picoCuries per liter (Ra²²⁶ plus RA²²⁸). To date, no information has been found that documents radium level in formation water from California OCS formations.

The yearly and total volume of formation water that is estimated to be discharged from each of the four possible areas of oil development (Point Arena, Bodega Bay, Santa Cruz, and Santa Maria) is given in Section II.A.1. Based on the most probable development scenario, the estimated daily formation water emissions, from each of the points of discharge (platform), will be:

TABLE IV.B.1.b.i-1

Area	No. Platform	Formation Water Emission (Gallons - thousands)	
		Area/Day	Platform/Day
Eel River	1	None	None
Point Arena	1	134.6	134.6
Bodega	1	25.8	25.8
Santa Cruz	4	170	42.6
Santa Maria	12	555	46.3

Formation water may be considered to have an impact on the ocean water quality when 1) ocean chemical constituents are raised above ambient condition; or 2) when ocean chemical constituents are increased to a concentration (level) that may have a deleterious effect on marine aquatic life. Ambient trace metal levels for the surface ocean water^a off central and southern California are given in Table IV.B.1.b.i-2. The maximum concentration that presents minimal risk of deleterious effects to marine life is given in Table IV.B.1.b.i-2. The amount of dilution necessary to reduce formation water chemical constituents to ambient ocean levels or concentration that present minimal risk to marine life are given in Table IV.B.1.b.i-2.

These data represent composite levels drawn from a large number of tests on a wide variety of organisms (NAS, 1972 and EPA Quality Criteria for Water, 1972). As pointed out in those reports, the levels actually tested on organisms which resulted in 96 hours LC₅₀ values for toxicity vary with the organism tested, the life stage, the method of applying the toxic substance and other parameters. The levels, as indicated in Table IV.B.1.b.i-2, are conservative and below published levels for acute toxicity. For example, lead toxicity values ranged from 0.1 ppm toxic to Sticklebacks (Gasterosteus aculeatus) to over 50,000 ppm for Mosquitofish (Gambusia affinis) for lead oxide. Although food web magnification of trace metals may be questionable (except for mercury) as discussed above for sediment resuspension problems, lower invertebrates could be impacted by trace elements in formation water

^aGenerally, trace metal concentration increases with depth (BLM, 1978).

TABLE IV.B.1.b.i-2

FORMATION WATER DILUTION FACTOR FOR AMBIENT TRACE METAL LEVELS AND
MAXIMUM TRACE METAL LEVELS THAT PRESENT MINIMAL RISK TO MARINE AQUATIC LIFE

Central and Northern California Ocean Water Marine Aquatic Life

Trace Metal	Concentration ^a Total Trace Metal	Ambient Ocean Water	Formation Water Dilution Factor ^b Needed to Achieve Ambient Ocean Water Concentrations	Maximum ^c	
				Concentration That Presents Minimal Risk of Deleterious Effects to Marine Aquatic Life ^c	Formation Water Dilution Factor ^b Needed to Assure Minimal Risk to Marine Aquatic Life
Cadmium		0.004-0.025 ug/l	7,000	0.2 ug/l	500
Chromium		No data		0.05 mg/l	No dilution needed
Copper		0.1 ug/l	600	0.01 mg/l	6
Lead		0.005.0-0.015	14,000	0.01 mg/l	14
Nickel		0.200	1,000	2.01 ug/l	100
Silver				1.0 ug/l	30
Zinc		0.005-0.030	100,000	0.2 ug/l	9,000

^apersonal communication: Dr. K. Bruland, 1979.

^bDilution Factor: Parts ocean water per one part formation water.

^cNational Academy of Sciences - National Academy of Engineering, 1972.

^dDilution factor decreases with depth as trace metal concentration increases.

thus reducing the biomass at the lower levels of the community trophic structure and, therefore, affecting the entire community. The transportation of trace elements in formation water may be enhanced over the same elements in drilling muds due to the larger volume involved if formation water is discharged and the greater extent of formation water dispersion plumes (according to the model of Dickey, 1980). The long-term sublethal effects of formation water are not known and the sublethal effects of trace metals and hydrocarbons, which are found in produced waters, is only recently begun to be investigated. Some data (Piltz, M-S thesis, 1974; Struhsaker et al., 1974) indicate reproductive parameters of polychaetes and fish may be impacted by relative low

concentrations of trace metal (copper at 0.1 ppm) and hydrocarbons (benzine at 6.7 or 12.1 ppm).

Prior to formation, water being diluted to non-pollutant levels, the magnitude of the affect formation water has on the marine environment is unknown.

The predicted number of oil spills for the lease Sale No. 53 area includes 2.29 spills of greater than 1,000 bbls and 163.28 spills of less than 1,000 bbls. The fate and effects of these spills, should they occur, are subject to a variety of factors influencing the rate at which oil disappears from the environment, the populations of organisms affected and extent of the impact on these populations. The type and quantity of spilled oil will influence the toxicity of the released hydrocarbons, crude oils being less toxic than refined petroleum products. The season during which a spill occurs will determine the degree to which water quality is degraded and the degree to which marine organisms are impacted. Spills which coincide with spawning or larvae recruitment to various marine habitats may be expected to have a greater impact than if they occur during other periods. Spills during winter oceanographic regimes in central and northern California may be expected to be dispersed and have less impact on organisms due to the greater wave and wind energies impacting the area thereby producing greater mechanical mixing of oil, greater evaporation and emulsification rates. The most severe water quality degradation would occur during incoming tides in relatively calm waters of enclosed bays and estuaries. Severe impacts would be felt in these areas since surface slicks of oil in shallow areas would create high chemical oxygen demands relative to the volume of water underneath the slick, and organisms in these habitats would be much closer physically to the oil compared to open ocean slicks. In addition, physical processes, which would break up slicks and aid in weathering the oil, are usually reduced in estuaries, and enclosed bays.

A variety of hydrocarbons and trace metals are found in petroleum crude and products some more toxic and some more stable in the environment than others. Trace metals usually found in crude oils include nickel (Ni) and Vanadium (V) in the greatest concentrations but cobalt (Co),

mercury (Hg), iron (Fe) and zinc (Zn) can be abundant in crude oil as indicated for some crude oils from California, Table IV.B.1.b.1-3.

Nickel appears to be relatively nontoxic to man and most marine organisms. Calabrese, et al. (1973) reported 48 hours LC₅₀ values for the American oyster embryos, Crassostrea virginica of 1,180 ppm and 310 ppm for embryos of the hard shell clam, Mercenaria mercenaria (Calabrese and Nelson, 1974). A limit for nickel in Drinking Water Regulations 40 FR 59566, Dec. 24, 1975. Significant reduction in both the number of eggs per spawning and the hatchability of eggs was observed at nickel concentrations of 380 ppm for the fathead minnow, Pimephales promelas (Pickering, 1974). Nickel is not considered to pose a significant threat to marine life at concentrations found in crudes characteristic of California crude (Filby and Shah, 1971). Vanadium is known to be selectively taken up from ambient sea water by certain ascidians (eg. Ascidia ceratodes) which use the metal in a vanadium porphyrin complex as a blood pigment (Riley and Chester, 1971). Vanadium has not been considered in quality criteria for water (EPA, 1976) and no information on toxicity could be located. At indicated concentrations in crude oil (Table IV.B.1.b.1-3) it is not considered to pose a significant impact given the tolerance of the ascidian but this needs further research. Of the other trace elements encountered in California crude oils, only mercury and zinc might pose significant threats to marine organisms. This would be especially true in the vicinity of the platforms where chronic oil leaks could be encountered or where accidental spills might originate due to blowouts.

The hydrocarbons in crude oil and partially refined products form a diverse complex of simple straight or branched chains which may be saturated or possess unsaturated double bonds, cyclic alkanes and alkenes, and aromatic hydrocarbons. Many individual compounds in each of these hydrocarbon classes have been examined and shown to be taken up by a wide variety of organisms (see Anderson, 1975 for a general review. Also Malins, 1977 and Wolfe, 1977). The uptake of petroleum hydrocarbons is dependent on many factors (Stegeman and Teal, 1973) and many enter organisms through two routes. The first involves uptake across sensitive transport surfaces from water soluble phase into the bloodstream or body cavity. Kauss, et al. (1973) found that freshwater phytoplankton rapidly uptake C₁₄ labelled naphthalene from solution. Anderson and Neff (1974) have described uptake of hydrocarbons by mollusks, some crustaceans and fish via gill membranes. Lee (1975) observed uptake of benzpyrene, methylcholanthrene and naphthalene from seawater solution of several groups of zooplankton. Corner et al. (1976) found that the copepod, Calanus helgolandicus accumulated naphthalene from concentrations as low as 0.10 ppb. Lee, et al. (1972a) found that Mytilus edulis, the bay mussel, was able to uptake hydrocarbons to other tissues. Lee, et al. (1972b) found that marine fish could take up hydrocarbons through the gills. The second route involves the uptake of hydrocarbons through digestive routes and this has been demonstrated for copepods (Conover, 1971) and barnacle larvae

TABLE IV.B.1.b.i-3
Trace Element Contents of 6 Crude Oils³

Elemental Conc (u g/g) ^b	Oil Number					
	RF-1	RF-2	RF-3	RF-4	RF-5	RF-6
Ni	93.5	113.0	78.6	116.8	1.25	20.5
V	7.5	6.0	4.9	112.0	26.0	8.2
Co	12.7	13.9	14.5	0.198	0.001	0.0354
Hg	21.2	1.49	1.46	0.139	0.0143	0.0898
Fe	73.1	77.2	89.5	36.9	5.0	4.94
Zn	9.32	19.50	19.60	2.619	0.0907	9.08
Cr	0.634	0.685	0.729	0.380	0.1	0.081
Mn	2.54	3.10	2.96	0.21	1.50	0.79
As	0.656	1.63	0.67	1.20	0.2	0.0773
Au	2.8x10 ⁻⁶			3.0x10 ⁻⁶	10 ⁻⁷	6.4x10 ⁻⁵
Sb	0.0517	0.061	0.11	0.273	10 ⁻³	0.055
Se	0.364	0.454	0.333	0.360	0.009	0.128
Sc	8.8x10 ⁻³	9.0x10 ⁻³	4.6x10 ⁻³	4.4x10 ⁻³	9.5x10 ⁻⁵	10 ⁻⁵
Cu	0.93	1.25	1.13	0.21	0.2	0.10
Na	11.1	65.2	15.5	25.0	1.0	13.0
Ca	192.0	75.1	103.0	150.0	20.0	20.0

^aOils RF-1, 2, 3 from California; RF-4, Venezuela, Louisiana and RF-6, Libya

^bConc = concentrations in ppm

From Filby and Shah (1971)

(Parker, 1970). The range of hydrocarbons in tissues of organisms varies greatly as reviewed by Cimato (1980). Concentrations varied from .0001 ppm benzopyrene in Mytilus (Clark and Finley, 1974) to several hundred ppm in the mullet, Mugil cephalus (Shipton, et al., 1970) for kerosene.

The concern regarding the exposure to and uptake of hydrocarbons from spills or chronic discharges is based on the possible food web magnification, reproductive effects and potential carcinogenicity of the accumulated hydrocarbons. Food web magnification was discussed previously for chlorinated hydrocarbons and potentially for petroleum hydrocarbons. Many organisms, including crustaceans (Lee, 1975; Corner, 1976), mollusks (Blumer, et al., 1970; Blumer and Sass, 1972) Stegeman and Teal, 1973; Anderson, 1973; Clark and Finley, 1974; Di Salvo et al., 1975) and fish (Anderson, et al., 1974; Anderson and Neff, 1974) are able to depurate accumulated hydrocarbons, thus perhaps explaining why food web magnification is not easily observed. Eldridge, et al. (1978) has shown reproductive effects in the striped bass Morone saxatilis upon exposure to low levels of benzene. Doubt exists as to the direct carcinogenicity of crude oil and its constituent compounds. Many polynuclear aromatic hydrocarbons (PAH) are known to be carcinogenic such as 3, 4 benzopyrene, phenanthrene and chrysene. The compounds appear to be accumulated and metabolized to forms with carcinogenic properties (see review by Varanasi and Malins, 1977). Considering these factors, there is essentially all levels of marine organisms. The exact nature of these impacts are being investigated currently.

Conclusion. According to the available data, it may be concluded that water quality in the immediate vicinity of oil exploration and production will be degraded. The degradation will decrease with distance from the platforms and no significant decrease in water quality should occur at distances greater than a few kilometers from the discharge points. The short-term acute effects of OCS activities in the marine environment, except for immediately around platforms, should not result in significant change in OCS benthic fauna. However, long-term, chronic impacts are unknown at this time and indications are that they could be significant in producing elevated trace metal and hydrocarbon concentrations in marine organisms and in interfering with reproductive processes.

Cumulative Impacts on Water Quality. The cumulative impact from existing and proposed OCS activities should not violate EPA Regulations, or OCS Orders, in the general California OCS Region. Water quality will remain good. The exceptions to high water quality will be within several hundred meters of oil and gas platforms where suspended solids in the drilling muds and cuttings discharge plume may exceed EPA limits and where trace metals and petroleum hydrocarbons may exceed Federal limitations due to the discharge of formation waters from producing wells and accidental discharges of small spills. Similar excesses may occur in the areas found municipal discharges. The cumulative effects

should longshore drift transport pollutants from the new San Francisco municipal outfall to the Santa Cruz area tracts or north to the Bodega tracts, might be to cause chronic violation of EPA limits but again the effects should be local. Tomales Bay and Bodega Bay and Harbor with general good water quality (Table III.A.1.d-1) may suffer some degradation due to cumulative OCS activities and increased municipal discharges which may be associated with OCS socio-economic impacts in these areas. The degree to which degradation of the water quality may occur (if at all) in these two areas is unknown. The levels of trace metals around the new San Francisco municipal outfall currently exceed ambient open ocean coastal surface water concentrations (see Tables III.A.1.d-3 and -4) and the continued discharge of the outfall should continue to degrade the water quality in the immediate area (comparable effects are revealed by SCCWRP studies of the Southern California Bight). Synergistic effects between trace metal pollution and other OCS discharge products are unknown at this time but, again, should result in water quality degradation in a limited area if at all. Thermal effluent discharges associated with conventional and nuclear power plants will raise ambient water temperatures in coastal waters around the plants. The cumulative impacts of thermal and other discharges should not be significant for the general OCS California region. OCS activities in the largest tract area, Santa Maria Basin, may produce a cumulative impact in Morro Bay where dairy land runoff has resulted in elevated coliform concentrations. Nearshore current information in this area is lacking making a conclusion as to the significance of OCS activities in the Santa Maria area to water quality in Morro Bay difficult to assess.

2. Impacts on Marine and Coastal Ecosystems: The impacts to marine organisms are addressed in this section and in IV.B.5 (Commercial Fishing) and IV.C (Impacts of Alternatives to the Proposed Action). Plankton, benthos, marine mammals, birds, endangered species, kelp beds, estuaries and wetlands, as well as terrestrial organisms, are discussed here.

The extent of biological impacts or ecological losses are defined in this section as follows:

- (1) Severe impact or ecological loss means that a species or assemblage has become extinct or eliminated from an area forever.
- (2) High impact or ecological loss denotes a significant long-term interference with ecological relationships. This usually involves the mortality or a biological alteration of a noticeable segment of the population, community or assemblage.

The definition of "long-term" must be rather arbitrary in terms of a specific number of years. If a generation of a particular species is eliminated from an area and it requires several generations to build the population to its original level, then this should be considered a long-term impact. However, since the reproductive periods of the various species varies from weeks in certain invertebrates to many years in other organisms, a long-term impact will, in reality, last several months to many years. Long-term impacts, as used here will be considered to be at least two years.

- (3) Moderate impact or ecological loss is between the two extremes of impacts and must be somewhat subjective. A moderate ecological impact probably occurred on the rocky intertidal during the Santa Barbara oil spill of 1969. Although some areas experienced nearly complete mortality to several of species, other species experienced low mortality. At other areas mortality to all species affected was moderate.
- (4) Low or small impact or ecological loss denotes an interference with ecological relationships, but the interference is not particularly significant to either the relationships or the species, community or assemblage, nor long lasting. Although the time interval again is somewhat arbitrary, as used here it will be considered less than a year.

a. Impacts on Plankton

i. Phytoplankton: Phytoplankton will experience impacts from drill cuttings and mud discharge, formation waters, pipeline burial, and oil spills during essentially every phase of the oil operations. The cause of mortality or sublethal impacts from the

above operations will be due to increased turbidity, smothering, and toxic substances. The areas of the water column most subject to impacts are the surface or near-surface layers which are occupied by nearly all phytoplankton.

Drill cuttings consist of sand, shale, limestone, and other pieces of the underground strata pulverized by the drilling bit. The drilling muds carry the cuttings back up to the drilling rig where they are separated from the drilling mud, washed to remove oil, and sometimes discharged overboard. The heavy cuttings quickly settle to the bottom and accumulate in a pile beneath the drillship. Field studies have indicate (Ray and Shinn, 1975; Ecomar, 1978) that drill cuttings do not significantly increase the water column turbidity around the drillship or platform. Drill cuttings discharge probably will produce an insignificant, local impact on the phytoplankton around the drilling rigs for the 60- to 90-day drilling period for each well.

Drilling muds consist of clays, barite, lignosulfonates, and small amounts of organic and inorganic chemicals dissolved in water or oil. Some mud is entrained with the discharged drill cuttings and is continuously lost during drilling. Periodically, some drilling muds will be discharged overboard. Some portion of the discharged mud settles to the bottom, but the muds usually create a turbidity plume extending down-current from the discharge point beneath the drilling rig. In an area of strong currents, probably representing conditions for near maximum dispersion rates, Ecomar (1978) observed a visible plume extending 2 to 3 km (1.2 to 1.9 miles) from an exploratory well. The well was being drilled in 63 m (208 feet) of water on Tanner Bank and discharging at an average rate of 10 bbl/hour. The discharged muds and cuttings were diluted rapidly in the water column, and the investigators found background levels of suspended solids and trace metals within 200 m (660 feet) of the discharge point. They estimated dilution factors of 500:1 to 1,000:1 within 3 m (9.9 feet) of the discharge pipe which was located at 12 m (39.6 feet) below the water surface. An additional 100:1 dilution factor occurred within 100 m (330 feet).

In the Gulf of Mexico, Zingula (1975) could not detect a mud and cuttings plume greater than 200 m (660 feet) from an Exxon production platform. In another Gulf of Mexico field study, Ray and Shinn (1975) measured background levels of alkalinity, total dissolved solids, total suspended solids, total organic carbon, and total dissolved chromium as close as 27 m (89 feet) from the platform.

It is possible in the local area, increased turbidity caused by the plume could decrease phytoplankton photosynthesis by obstructing light penetration. This effect would probably last only a few hours for a given water parcel passing by the discharge source. The residence time for phytoplankton within the water parcel and within this reduced

euphotic zone would depend on the vertical and horizontal transport at the time. Unlike fish and other good swimmers, the phytoplankton in a given water parcel are unable to avoid the turbidity plume, and would pass through it with the water parcel. The decreased photosynthetic effects could cause minor, short-term impacts on the phytoplankton populations that pass through a plume extending 200 m (660 feet) or at a maximum 2 or 3 km (1.2 to 1.9 miles) in the down-current direction from any exploratory drilling wells in this proposed action. This effect would have a minor, and probably immeasurable, impact on the total phytoplankton productivity of central and northern California offshore areas of concern.

Drilling mud components are known to be toxic to marine organisms and, however, the toxicity varies by the mud type and the organisms tested. McAuliffe and Palmer (1976) have summarized the published toxicity data for drilling fluid components. Although there are no data for toxic effects on phytoplankton, the 50-percent lethal concentrations reported for a 96-hour test period for various marine organisms are in the greater than 50 to greater than 100,000 ppm range. The Department of Interior (1977) has reported bioassay data for drilling muds submitted to EPA Region II for NPDES permits. Bioassays for Skeletonema costatum, a common phytoplankton species, showed less sensitivity to salt water gel muds and ferrochrome lignosulfonate freshwater mud than Acartia tonsa, a common marine copepod. Fifty percent lethal concentrations were 385 mg/l (ppm) for ferrochrome lignosulfonate mud for the copepod. Lethal concentrations for drilling mud discharges will probably occur only near the discharge point from the exploratory rigs. With the dilution factors observed in the field, and the extent of the plumes around the exploratory rigs, any toxic effects on the phytoplankton would be around the exploratory rigs. Since the toxic effects would be limited to a small area around the rigs, only a minor impact would be expected on the phytoplankton populations in central and northern California offshore areas.

Some of the discharged, formation-water would form a plume extending down-current from the discharge point. Since the formation water is denser than the surrounding ocean water, most of it would sink and mix with deeper waters. Impacts on the phytoplankton could include physiological stress from cells losing water to the surrounding brine, and stress from low dissolved oxygen. Since the dilution rate for the discharged formation water would probably be very high, any harmful effects would be concentrated around the platforms. This increased stress could result in a local depression of phytoplankton photosynthesis close to the discharge point. However, these effects have not been noted in field investigations in the Gulf of Mexico around producing platforms (Mackin, 1971; Gulf Universities Research Consortium, 1974). The chronic introduction of low levels of oil and grease into the ocean from formation waters represents an additional source of hydrocarbons that will be discussed below, under oil spill impacts. In

summary, the impacts of discharged formation water from the production phase should not have a significant impact on the phytoplankton populations in the area.

The major potential impacts on phytoplankton from this proposed action would result from oil spilled into the surface layers of the ocean from several sources. Chronic, low-level hydrocarbon input to the ocean from this proposed action includes small spills (less than 1,000 bbl) from accidents and normal day-to-day platform operations, the addition of entrained hydrocarbons from discharged formation water, and low-level discharges from tanker loading and off-loading operations. An estimated 143 spills of 50 to 1,000 bbl is projected in the entire proposed lease area over the production life of the fields.

Impacts on phytoplankton from oil pollution can range from lethal effects under high concentrations in the surface layers of the water column after a major spill, to sublethal effects such as decreased photosynthesis and impaired growth from low-level concentrations. The National Academy of Sciences (1975) states that there is no evidence for food web magnification for petroleum hydrocarbons in the marine environment. NAS also concludes that phytoplankton can absorb oil onto their cell walls, but there is no transfer of hydrocarbons into the cell occurred at the low levels found in the marine environment.

Laboratory experiments on the effects of varying oil concentrations on species of phytoplankton isolated from different seas have been carried out by Mironov (1975). Using various species of diatoms and dino-flagellates, some of which are quite common off the California coast, Mironov demonstrated that as oil concentrations increase, the reproduction of the phytoplankton decreases relative to the control during 5-day growth periods. He noted that the cells of most species died at a concentration of 1.0 ml/l (1 ppm) during the first day. Mironov also observed a difference in species sensitivity to oil concentrations, with cells dying in a wide range of concentrations from 1.0 to 10^{-4} ml/l (1 to 0.0001 ppm). This indicates a high sensitivity to crude oil of many phytoplankton species.

The limited number of field studies conducted after major oil spills have not detected significant impacts on phytoplankton. Since the distribution and abundance of the plankton community is so variable and patchy in time and space, it is difficult to determine changes which are significantly greater than the natural variations of phytoplankton populations. Additionally, the factors influencing the biological effects of an oil spill in the open ocean are varied and complex. NAS (1975) lists the factors as: 1) the amount of oil spilled; 2) the oil type; 3) the oceanographic conditions; 4) the meteorological conditions; 5) the turbidity or sediment load in the water column; 6) the season of the year and the corresponding biological cycles; 7) the biological species involved; and 8) the methods of spill cleanup utilized.

The most severe impacts of a major oil spill on the phytoplankton in the study area would occur in the spring and summer months when the productivity and standing crop is highest. Lethal effects from a large spill would probably damage only the phytoplankton in the surface layer of the open ocean. Phytoplankton photosynthesis and cell division could be depressed during a major oil spill if hydrocarbon concentrations in the water column were much higher than 1 ppm. Lower hydrocarbon concentrations in the water might stimulate photosynthesis and growth for some species.

In conclusion, the platform spills from the proposed sale should not have a significant impact on the phytoplankton populations in central and northern California offshore areas. The effects might be acute for a short time under a slick in the top-most surface layer of the ocean, but the phytoplankton populations probably would recover in the area in a few weeks or months.

Whether there are chronic impacts on phytoplankton in the open ocean due to cumulative spills is not known.

ii. Zooplankton: Zooplankton will be subject to the same impacts as phytoplankton and will generally experience the same effects. The distribution of zooplankton is even more complex than phytoplankton because several species vertically migrate to the surface layer of the water column at night to feed. This vertical patchiness in distribution and abundance adds to the complexity and variability of zooplankton patterns in surface waters at any given time. Generally, the younger stages of zooplankton and fish larvae are found in the surface layer. These facts add a further dimension to possible impacts.

The impacts from drill cuttings and drilling muds are similar to that on phytoplankton, except local, increased-turbidity caused by the drilling mud plume could have a smothering effect on some zooplankton species in the surface layer of the water column in the plume area. The increased turbidity could result in temporary clogging of the filter-feeding mechanisms of some zooplankton. This clogging would cause decreased filtering and feeding efficiency. It is assumed that this effect would probably last only a few hours for a given water parcel passing by the discharge source. The residence time for zooplankton within the water parcel would depend on the vertical and horizontal transport at the time. Unlike fish and other good swimmers, the zooplankton in a given water parcel are unable avoid the turbidity plumes, and will pass through them with the water parcel. The smothering effect from turbidity would cause minor, short-term impacts on the zooplankton populations that pass through a plume between 200 m (660 ft) and a maximum of 2 or 3 km (1.2 to 1.9 miles) in the down-current direction from drilling wells.

Impacts on the zooplankton from discharged formation water could include physiological stress from dissolved salts and stress from low-dissolved oxygen. Since the dilution rate for discharged formation water would probably be high, harmful effects should be concentrated around the platforms. The chronic introduction of low levels of oil and grease entering the ocean from formation water represents an additional chronic source of hydrocarbon that will be discussed below under oil spill impacts.

The most significant impacts of major oil spills on the zooplankton in the area would be in the spring and summer months when standing crop is

highest. Severe kills of zooplankton or fish eggs and larvae from a large spill would damage only the zooplankton in the surface layer of the ocean, and the neuston community. Sublethal effects could include disruption of feeding behavior, growth inhibition of some larvae and egg stages, and interference with chemical reception. Lethal effects would occur only if concentrations were greater than about 0.1 to 1 ppm in the water column. Anchovy larvae feeding at the surface at night could ingest oil as they gulp for air to fill their swim bladders. During periods of vertical migration, euphausiid shrimp and copepods could ingest or take up oil and transport it to deeper layers in the water column. If dispersants are used to maintain the oil in the upper 3 to 4 m (9.9 to 13.2 ft) of the water column, the zooplankton in this layer would be exposed longer to the oil and dispersant-oil mixture. Zooplankton have been observed (Grose and Mattson, 1977) to accumulate oil after a major spill but the effects of this accumulation are presently unknown.

In the event of a major spill, the most serious threat would be to benthic invertebrate or fish larvae. Meroplankton (temporary) from the benthic invertebrates or fish whose spawning and entire planktonic stage happened to correlate with a large oil spill, could experience poor survival for that year class in a particular region. Assuming larvae were constantly at the surface, and experienced 100% mortality upon contact with a slick, the oil film would have to completely cover the surface of an area for many miles to cause a high ecological impact for a wide area and for many species. Oil slicks tend to travel in wind rows and huge patches rather than by a film completely covering the surface for many square miles. However, a medium ecological impact could occur when a year class was reduced or eliminated, since future adult populations would subsequently be reduced in certain areas.

An exception to this is in estuaries where high impacts to communities could result from destruction of planktonic larvae.

The two factors operating to minimize effects of oil on plankton are: 1) all fractions that enter the water column disperse rapidly so that concentrations are usually very low, and 2) plankton populations typically have rapid regeneration rates and usually cover large geographic areas. Michael states that even if one assumed 100 percent mortality at the site of a spill, it would be difficult to demonstrate the significance of effect on the overall population.

Whether there are chronic impacts on zooplankton in the open ocean due to cumulative spills is not known.

Conclusion: Although many plankton will be killed or affected sublethally, these impacts would probably be short-term and recovery should occur within a few weeks to a few months for phytoplankton and a few months to a year for zooplankton. Planktonic populations, in general, have relatively short life cycles and rapid reproductive rates. Also, since they extend over the entire area and are constantly moving with the currents, the probability that a significant portion of the population would be destroyed, even with a major spill is low.

A reduction in the survivorship of a year class of benthic invertebrates or fish which have planktonic larval stages is possible for limited areas. The magnitude of this year class reduction could be less, equal to, or more than normally caused variations in year class survivorship. The survivorship of the next year class should be unaffected. The remaining population would be only slightly affected in subsequent years, unless the parent population had been greatly reduced by the same spill, or some other catastrophic event. 4-89

b. Impact on Benthos

i. Subtidal: The activities which may have adverse impacts on subtidal bottom dwelling organisms (plants and animals) include: discharge of drill cuttings and drilling muds; discharge of formation water and other wastewater; pipeline construction; emplacement of structures and rigs; and oil spills. The emplacement of structures and pipelines (not buried) may have a beneficial impact on certain kinds of subtidal organisms in so far as they will provide additional hard bottom type substrate.

Within about 50 m (164 feet) of a platform or rig, most of the benthic life will be buried from the drill cuttings and drilling muds. These sediments may be several feet thick directly below a platform. It is assumed that the sediments probably would be recolonized after a period of time; however, this colonization may not be by organisms characteristic of the surrounding area. Recolonization time would be related to the rate of sediment deposition, nature of the material deposited and its toxic properties, if any. Biologically, recolonization would primarily depend upon the rates of immigration and larval settlement into the impacted area. The emplacement of structures (including pipelines) and rigs would physically disrupt the benthic environment and cause the elimination of most or all benthic organisms around them. Pipelines may disturb an area 40 m (131 feet) wide (U.S. Department of the Interior 1979) along their axis. In general, these disturbances would be short term in duration, and not particularly significant unless they were to occur on a unique habitat (such as hard bottom).

Generally, crude oil spills do not have major impacts on subtidal benthic organisms. This is because much of the oil will float on the surface or vaporize into the air. Some oil will sink and contaminate the sediments, however, and most probably cause short-term reductions in the abundance of populations of benthic organisms. Most benthic organisms have reduced mobility and little ability to escape toxicants, such as oil, which may settle to the bottom. Generally, with the broad expanse of the bottom, emigration and larval repopulation would be expected to fill the void created by killed organisms. However, benthic organisms often tend to be clustered for various reasons. Oil landing on or near dense clusters could be detrimental to a species, particularly those with small or limited distributions. Possible rare endemics near Point Conception or something similar to the rare "Fossil limpet" Vema located at only one area in southern California come to mind as possible species in this category.

The location of rocky bottom areas in central and northern California are not completely known. Visual 5 contains what is thought to be a fair representation of these areas (Weldy and Williams, 1975). Because the bottom can change appreciably as a result of drilling operations

beneath a platform, the rocky bottom assemblage may be completely destroyed. Generally no species will become extinct if they are present on other rocky bottoms. A problem may arise with platforms set on a particularly important habitat where fish may depend upon the reef for food; development activity may force fish to scatter to other areas in search of better feeding grounds. The impacts of this would probably be localized but if it were an important sports fishing area there could be a significant adverse impact on the fishery. Drilling platforms also may attract fish and partially replace the rocky feeding area as a fish concentrator.

The effect of oil spills on planktonic larvae of benthic organisms has been mentioned in Section IV.B.2.a. It should also be noted that when mechanical oil spill equipment is not effective, dispersants may be used, however, the dispersed oil is generally found in the upper portion of the water column. Some of the smaller shrimp and crablike organisms (microcrustaceans) are reported to be particularly sensitive to oil contamination and would probably be among the first of the benthic organisms to be impacted by an oil spill.

Conclusion: The overall adverse impacts of hydrocarbon development to the subtidal benthic macroinvertebrate community will probably be low. However, should oil contamination of the sediment occur, some localized reduction in benthic populations would occur. Under these conditions, changes in benthic composition may also result in soft bottom substrates. Localized reduction of benthic populations is not expected to be high, except where hard bottom assemblages are isolated, rare, or unusual (e.g. "Fossil limpet", Vema in southern California). The potential for this kind of impact is greatest in the Santa Maria Basin because this is where the greatest number of spills are statistically predicted. The least potential for this kind of impact would be in Bodega Basin because the fewest number of spills are statistically predicted in this area (See Oil Spill Model input, Section IV.A).

ii. Intertidal: Intertidal literature that is concerned with impacts as a result of oil spills and other causes is summarized in OCS Sale Nos. 35 (1974) and 48 (1979) and National Academy of Science (1975). In general, oil spills are the major cause of adverse impacts. Mortality, up to 100 percent of the individuals, has been primarily caused by smothering of certain species, while other species are apparently unharmed or harmed only slightly. The recovery rate after disturbance appears to be near normal once the oil is no longer present on the substrate. Rocky intertidal communities have suffered greater damage than sandy beaches, although there is a greater potential for the oil to remain entrapped in the sediment on sandy beaches. The greatest long-term danger would come from several massive spills reaching shore rapidly and occurring every few years. Based on the oil spill model, this level of repetition is not expected, although more than one spill is expected in the Santa Maria area.

The oil spill model predicts that only three shoreline segments, in the Santa Cruz and Santa Maria areas, have a 5 percent or greater probability of a hit within 3 days of the spill. Three days is the most critical time category because of the greater amount of toxic fractions remaining in the oil spill.

Santa Cruz Area. Segment 18 consists of several 5 to 9.5 km (3 to 6 miles) stretches of rocky shore separated by sandy beaches of 9.5 to 13 km (6 to 8 miles) lengths. The most unusual rocky shores are located at Fitzgerald State Park. There is a 10 percent (3 days) and 24 percent (30 days) probability of a large spill reaching an intertidal area in this segment. This impact can be serious for much of the community. Recovery would be expected to begin within a year, reproductive capacity achieved within 5 years, and the community returning to pre-disturbance structure within 10 years. These periods are based upon intertidal dominants having long reproductive recovery rates. According to Vesco and Gillard (1980), many of the intertidal species of the California coast reach sexual maturity within 2 years, while community recovery periods vary from 1 to over 10 years depending upon geographic location and the vertical level within the intertidal.

Santa Maria Area. Based on the oil spill model, segments 26 and 27 have hit probabilities of 15 percent and 12 percent in 3 days and 22 percent and 15 percent in 30 days respectively, according to the oil spill model. Segment 26 is one of the more unique and important stretches of shoreline in central California. Reasons for this include: 1) the important Pismo Beach clam area, 2) the Nipomo Dunes and Wetlands with its large number of endemic dune species, 3) the reported reproductive isolation of species in the Diablo Canyon rocky intertidal area (Burge and Schultz, 1973). Segment 27 consists of several isolated rocky intertidal areas separated by stretches of sandy beaches which range from 9.5 to approximately 32 km (6 to 20 miles) in length. Repopulation of destroyed species in these rocky intertidal areas should a spill cover the entire stretch may be retarded significantly. If Burge's and Schultz's assumption that the repopulation of the Diablo Canyon intertidal area comes entirely from within the area is correct, the commencement of repopulation may be delayed for possibly a year in this area. Larvae from species previously in the Diablo Canyon area may not reach vacated areas as rapidly as if they were spawned from within the canyon region itself. Once repopulation commences, recovery probably would proceed as discussed above, although other dominant species could, as a result of advantageous setting times out-compete the original dominants. The probability of the entire 21 km (13 mile) stretch of the Diablo Canyon coastline being covered with oil is not predicted by the oil spill model, but should be less than the maximum 21 percent predicted for a hit on Segment 27. The tolerance of the Pismo clam to oil pollution has not been examined, thus massive mortality to an oiled population cannot be excluded. At the very least, an oil spill would preclude clamming for as long as oil remained in the area. Inferring

from related species, an oil spill would impart an oily taste to the flesh for approximately 30 days afterwards. The endemic species on the Nipomo Dunes area will not be harmed directly by an oil spill, but could be damaged during cleanup operations. Cleanup operations could also compound the damage to other intertidal areas, both rocky and sandy, up to the extent of total mortality of macroorganisms located in the area actually cleaned.

Conclusions: The impact of an oil spill would cause mortality of certain local rocky intertidal organisms. However, the recovery rate after impact would be expected to be similar to naturally disturbed communities (i.e., return to pre-disturbance species composition and abundance in two to ten years, depending on the community receiving impact). An exception to this would be a delay in recolonization on the reproductively isolated shores (e.g. Diablo Canyon area). The possibility of a hit could increase if a spill occurred during periods of increased wave height (waves greater than 1.5 m [5 ft.]), or increased wind velocity (velocity greater than 48 km/hr [30 mph]) (refer to IV.B.2.g).

Generally, the adverse impacts of an oil spill would be low for sandy beaches. An exception would be in areas that support populations of clams, such as Pismo Beach. At the very least, an oil spill would preclude clamming for as long as oil remained in the area. The endemic species in the Nipomo Dunes area would not be harmed directly by an oil spill, but could be damaged during cleanup operations. Depending on the methods employed during cleanup operations, damage to other intertidal areas, both rocky and sandy, could be expected.

The long-term impact of chronic pollution is unknown.

c. Impacts on Marine Mammals: Development of the Sale No. 53 OCS area could possibly affect some 28 species of marine mammals (Section III.A.2). The majority of these species are pinnipeds and cetaceans which either reside near or migrate through the lease area.

Impacts on Pinnipeds and the Sea Otter. This section presents an overview of potential impacts on pinnipeds and the sea otter. Oil pollution and disturbance due to increased human activity could affect marine mammal populations native to the proposed sale area. Other impact-producing agents which could be associated with petroleum development and production include marine disposal of drilling muds and cuttings, marine disposal of formation and cooling waters, dredging and filling (such as that associated with pipeline construction), and secondary development. Table IV.B.2.c-1 summarizes potential hazards to native mammals. It is not possible to predict with any precision how interaction of these several major variables may affect the mammalian species found in or near the proposed sale area on the long term basis. However, available information can, at least, broadly define many potential effects and help to identify those species most sensitive to various perturbations, particularly those effects observable on a short-term basis.

Short-Term Direct Oilspill Effects: Contact with floating oil affect pinnipeds in four ways: 1) by fouling of integument (hair/fur/skin), 2) by ingestion, 3) by inhalation, and 4) by irritation of eyes and membranes. Direct (and indirect) effects of spilled oil would vary depending on the population density and physiological status of the affected mammal species, season and meteorological conditions, chemical or physical characteristics of the spill, duration of exposure, type of exposure (e.g., ingestion versus external contact), and other factors. An effect which is often thought to be associated with spilled petroleum products is direct mortality to marine mammals due to acute contact, such as what may occur when individual organisms are coated by spilled oil. For certain species, direct mortality as a result of contact with spilled oil may not be an immediate result. LeBoeuf (1971), who examined some of the effects of the Santa Barbara spill, concluded, "the crude oil which coated many weaned elephant seals at San Miguel Island in March and April had no significant immediate nor long-term (1-15 months later) deleterious effect on their health. Had the rookery been contaminated earlier in the season when females were nursing, pups might have ingested the crude oil and more serious consequences might have ensued." Brownell and DeBoeuf (1971) tagged live oily and clean sea lion pups to determine percentage mortality following the Santa Barbara spill. Among the tagged pups, significantly more dead sea lion pups than living pups were oil-fouled, but no cause and effect relationship was postulated due to scant data. An oil spill that contaminated a gray seal rookery in Wales resulted in significantly lower peak weight of oiled pups and a very high overall mortality for both oily and clean pups (Davis, and Anderson, 1976). The high pup mortality was said to be

TABLE IV.B.2.c-1

SOURCES OF POTENTIAL HAZARDS TO MARINE MAMMALS AND SEABIRDS
RESULTING FROM OFFSHORE OIL DEVELOPMENT AND PRODUCTION

<u>Activity or Facility</u>	<u>Chronic Hazards</u>	<u>Catastrophic Events</u>
<u>Exploration</u>		
Seismic profiling	Noise, "startle" effects	Sub-surface noise - Concussion
Drilling		Siltation
Boat traffic	Prop hits	Downstream pluming
		Opacity increases
<u>Operation</u>		
Onshore facilities		
Staging areas	Disturbance near reproductive areas of sensitive mammal populations (depends on site)	Disturbance in construction
Pumping stations		
Tank farms		
Separation plants		
Refineries		
Offshore facilities		
Production platforms		
Well-head		
Support	Leakage-seepage	Blow-out
Crew and supply boats	Sub-surface noise and propeller hits noise in air	
Aircrafts		
<u>Transport</u>		
Pipelines	Leakage	Rupture
Pumping buoys	Leakage	
Barges and tankers	Bilge Oil	Explosion, collision or grounding
<u>Clean-up</u>		
Oil on water		
Skimmers		Boat activity
Burn-off		Pollution--air
Chemicals		Pollution--water
Grounded oil		
Booms		Disturbance to sensitive marine mammal populations on islands by human intrusion and aircraft activity
Straw		
Chemicals		

MARINE MAMMAL SPECIES OF CENTRAL AND NORTHERN CALIFORNIA MOST
VULNERABLE TO IMPACTS FROM OFFSHORE PETROLEUM DEVELOPMENT

<u>Species</u>	<u>Comments</u>
Southern sea otter	Threatened species; extremely vulnerable to exposure, stress, and loss of buoyancy resulting from oiling of fur. May ingest oil while grooming, drinking, or feeding on contaminated shellfish; will die if food supply becomes insufficient, since must consume an estimated 25% body weight in food daily. Entire population, is found in nearshore waters between Santa Cruz and Pismo Beach.
All pinnipeds	Moderately susceptible to disturbance of rookery areas and hauling grounds; pups may ingest oil during suckling if mother is fouled.
California gray whale	Endangered species; migrates predominantly in band from 0 to 15 km off the mainland. May be susceptible to effects of disturbance or direct and indirect effects of oil pollution.
Blue, fin, humpback, sei, and sperm whales	Endangered species; Pacific stock population variable, ranging from about 1,000-1,200 humpbacks to 180,000 sperm whales; migrate or occur along western margin of the California Coast. May be susceptible to effects of disturbance or direct and indirect effects of oil pollution.
Pacific Right Whale	Endangered species; population estimated at about 200. Occasionally sighted off the coast of California. May be susceptible to effects of disturbance or direct or indirect effects of oil pollution.
Harbor Porpoise	This species is most frequently found in large harbors and bays of northern California. May be susceptible to effects of disturbance or direct and indirect effects of oil pollution.
Northern Fur Seal	Vulnerable to exposure, stress, and loss of buoyancy resulting from oiling of fur.

related to oil clean-up activities with accompanying disturbance, stress and disruption of the social structure. The ultimate survival of the smaller, oily pups remains in question.

On the other hand, species such as sea otters or fur seals are particularly sensitive to oil contact. These species minimize heat loss with their fur, rather than with a layer of blubber. Kooyman and Costa (1978) found that the metabolic rate of a sea otter increased 22 percent after oiling of one-third of the dorsal surface with only 38 milliliters of crude oil. Other experiments by the latter authors indicated that oiled sea otters demonstrated increased metabolic rates to 1.4 times the normal rate. These effects were observed in some cases to last a few days to 2 weeks, but it was concluded that after repeated oiling, return to normal metabolic rates may be impossible. Thus, exposure of sea otters to crude oil in natural environments "would probably cause significant thermal stress and could lead to hypothermy and/or pneumonia resulting in death," (Kooyman and Costa, 1978). Kooyman, et al., (1976) found that thermal conductance of oiled fur seal pelts increased from 1.4 to 2.0 times that of unoiled pelts. They concluded, "Any contact with oil at any time of year would have a profound influence on the health of individual northern fur seals through increases in pelt conductance with concomitant increases in metabolic rate. That death would inevitably follow such contact cannot be verified from the present effort. However, considering that 1) oiled animals have greatly increased maintenance costs, and 2) they are extremely reluctant to enter sea water (where their food is found), it is clear that the health of oiled animals would be in serious jeopardy." (Kooyman, et al., 1976.)

Sea otters and fur seals depend on the integrity of their underfur for insulation. Ingestion of oil by otters through eating contaminated prey items, drinking oiled sea water, and grooming their oiled pelage could also prove toxic and fatal. Any severe reduction of their food supply could cause death since to maintain a high body temperature, to ward off the cold, sea otters must consume about 25 percent of their body weight daily (12-15 lbs.). Ingestion of lightly-contaminated prey could cause long-term, lethal or sublethal effects.

The entire population of about 1,500 sea otters (1979) is distributed between Pismo Beach and Santa Cruz (1980), bracketed by the two largest OCS No. 53 Lease Sale tract areas. Cleaning and husbandry techniques for oiled otters are being developed but are not perfected; under any circumstances, the prognosis for rescuing more than a few is acknowledged to be dim. Cleaning can cause even more exposure and metabolic stress than oil, and recovery takes a minimum of 2 weeks in captivity under most optimum of conditions, with survival unsure even then.

Barabash-Nikiforov also reported that a 1964 shipwreck spilled over one thousand tons of gasoline, which covered 40 km (25 miles) of coastline and resulted in the deaths of over 100 sea otters. This study did not

indicate whether any sea otters located in the vicinity were able to survive the spill. Therefore, direct mortality from oiling as a result of short-term effects on animal heat dynamics would be likely to occur for sea otters and fur seals.

Response to acute contact with oil by certain marine mammals may be manifested by a variety of apparently non-lethal physiological effects. Geraci and Smith (1976) found that ringed seals immersed in crude oil for 24 hours suffered transient eye problems, and minor kidney and, possibly, liver lesions, but detected no permanent damage. The same workers found that harp seals fed 75 milliliters of crude oil suffered no significant effects. Geraci and St. Aubin (1979), in review of the latter research, considered the dosage used as "substantial," but noted that pathological changes can be induced by administration at higher levels. Also, Geraci and St. Aubin (1979), noted that their experiment exposed ringed seals to gaseous volatile hydrocarbons at concentrations higher than would be encountered as a result of an oceanic spill, yet no associated lung pathology was detected.

It can be concluded, therefore, that short-term exposure of certain phocid seals (such as ringed and, probably, harbor seals) will produce minor physiological effects such as eye irritation or non-permanent kidney and liver injury. Behavioral effects are not understood, but for the few species studied such as fur seals and sea otters, increases in grooming behavior are likely (Geraci and St. Aubin, 1979). As observed in ringed seals (Geraci and Smith, 1976), increased aggression and irritability may also result. Since field observations of sea lions suggest that scent is important in recognition of pups by females, coating of animals or other contact with oil could inhibit such recognition and lead to pup abandonment and starvation. For many species, baseline behavioral studies are lacking; and little information exists to predict behavioral response to oil spills or how such response would ultimately impact population trends and/or structure.

Long-Term and Chronic Direct Effects: It is likely that longer exposure or repeated exposure of marine mammals to spilled oil would result in more significant physiological effects than those discussed above, particularly in terms of irritation of eyes, liver tissue, or degradation of pelage (especially for sea otters and fur seals).

The ultimate direct effects of low-level chronic oil contact on marine mammals are not known. It has been suggested that long-term effects can only be assessed under field conditions (Geraci and St. Aubin, 1979), primarily through monitoring efforts. One possible result of low-level or chronic pollution would be to contribute to physiological stress on marine mammal populations which may be at or near carrying capacity. Some writers, such as Geraci and Smith (1977), have suggested that oil contact may trigger death in stressed seals. Stress in wild mammal populations (characterized by decreased reproduction, decreased

resistance to disease, and increased mortality) may be induced by a complex of factors related to population density, social interaction, nutritional factors, genetic changes, climate, and a host of other environmental influences. From similar research with other mammalian species, it can be concluded that responses of wildlife populations to individual stressors is extremely varied, and the extent to which chronic oil pollution would contribute to physiological stress and thereby affect marine mammal populations is also variable. Populations or individual wild animals which appear to be under stress associated with density, habitat deterioration, or reduced food availability, may respond to interactions of these factors with chronic, low-level oil contact.

There is little, if any, evidence to show whether or not sea lions, sea otters, fur seals, or other pinnipeds of the proposed sale area are currently susceptible to major stress-mediated responses to chronic or low-level oil spillage. Localized sea otter populations at or near carrying capacity may demonstrate responses of indeterminant nature and extent.

Indirect Effects of Oil Pollution: Indirect effects of oil pollution on marine mammals would be those associated with destruction and contamination of food sources, or essential habitat. Species most susceptible would be those which rely on a restricted or sedentary food source (such as sea otter), or those with a behavioral sensitivity to habitats which have been contacted by oil. Sea otter populations are limited to a significant extent by food availability. Therefore, changes in food supply caused by oil spills would be likely to have major consequences to sea otters. Marine mammal species which feed on pelagic fish (such as sea lions, fur seals, and harbor seals) may be less sensitive to localized loss of food sources.

There is much evidence that the productivity of colonially-breeding animals is limited by the availability of food. Even small changes in the abundance of prey, time required for foraging, or nutritional suitability of prey can cause major alterations in reproductive ecology.

No one really knows how drilling muds, or trace metal pollutants affect marine food chains but other environmental alterations due to offshore oil production, such as spilled oil, may have the potential to preempt or spoil a major feeding area.

Substantial gaps exist in available information regarding potential behavioral-induced exclusion of marine mammals from habitats which have been oiled. Little is known about the habits of pinnipeds, and even less is known about cetaceans, encountering floating oil at sea.

Other indirect effects of oil spills on marine mammals include possible bioaccumulation of hydrocarbons and petroleum-derived compounds.

According to Risebrough (1978), little is known about pathways of possible accumulation and virtually nothing is known of their persistence in marine mammals. Neff (1979) in a review of literature on toxicity and ecological effects of marine disposal of drilling muds, theorized that heavy metals associated with used drilling muds would not readily bioaccumulate if disposed of at sea because they are of relatively low toxicity and have a limited bioavailability. Certain species of seals are suspected of having abilities to detoxify methyl mercury obtained through ingestion, and sea otters may have an inherent mechanism which protects them from the effects of cadmium (Rosebrough, 1978). Background levels of heavy metals, chlorinated hydrocarbons, and other toxic substance in the marine environment would make it extremely difficult to evaluate the effects of bioaccumulation of petroleum-related hydrocarbons on marine mammals.

Noise and Disturbance. Offshore petroleum development leads to increases in ship and aircraft traffic near offshore facilities and between these facilities and the shoreline. Increased traffic of aircraft or boats or other human activity near pupping and breeding rookeries may lead to behavioral responses detrimental to mammals utilizing such areas.

Most pinniped species are very wary of man. When approached by man species which occupy rookeries or feeding areas often panic and stampede. A stampede often causes many of the animals to be injured or killed, or result in the trampling or abandonment of young by adults. This trait may make it difficult to respond to a spill at a haul out area. Chronic disturbance could also lead to reduced productivity or abandonment of breeding areas.

Natural Gas and Gas Condensates. Currents, wave action, and wind would be expected to disperse, dilute, and evaporate gas and gas condensate pollutants rapidly. However, animals in the immediate vicinity of a pipeline gas leak may be affected during and shortly after the leak occurs. Inhalation of toxic vapors could be fatal to marine mammals. Pipeline burial, which may temporarily increase benthic fauna that attract mammals (especially sea otters or harbor seals), would increase such risks to individual animals.

Other Impacts. Factors which may affect marine mammals include marine disposal of formation waters or cooling waters, shoreline alteration, facility siting, physical presence of offshore structure, dredging and filling, and secondary development. During exploratory phases of the proposed sale, most of these impacts on marine mammals are not expected to be significant. Of major concern would be permanent loss of habitats as the result of facility siting and secondary development associated with development phases. Existing legislative constraints and permitting procedures may help minimize localized impacts.

Impacts on Cetaceans. Petroleum energy development projects may affect cetaceans as a result of oil spills from wells or transportation systems, noise and human activity, or facility construction. Oil spills may result in direct pathological consequences (e.g., tissue damage, reduced feeding efficiency) if cetaceans contact spilled hydrocarbons or result in indirect consequences through reduced or contaminated food supplies. Noise and human activity may result in whale behavior which leads to avoidance of available habitat, forced alteration of migration routes, or other behavioral responses detrimental to the species. Noise sources which may affect cetaceans include, but are not limited to, geophysical exploration, vessel and aircraft traffic, drilling activity, and construction of platforms. Onshore and offshore construction and placement of structures or facilities may physically destroy or alter available habitat, thereby reducing the ability of marine and terrestrial environments to support endangered species.

Direct and Indirect Effects of Oil and Gas Pollution. There is no evidence whether or not cetaceans are able to detect hydrocarbon pollution, and if so, avoid it. Accounts from past oil spills show that marine mammals such as seals and sea lions may not avoid oil; however, there has yet to be found a confirmed case of a whale, dolphin, or porpoise found coated or fouled with oil (Geraci and St. Aubin, 1979). However, unlike pinnipeds which come ashore with obvious evidence of oil, oil-fouled cetaceans could go unnoticed. The nature of cetacean skin suggests that they may be vulnerable to toxic effects of surface contact with hydrocarbons such as gas condensates (Geraci and St. Aubin, 1979). The epidermis is not keratinized, but composed of live cells (Geraci and St. Aubin, 1979). Geraci and St. Aubin (1979) reported that cetacean epidermis is virtually unshielded from the environment, and may react to noxious substances such as crude oil or gas condensates in a manner similar to sensitive mucous membranes.

Field observation of at least one instance of possible contact of gray whales with spilled oil did not show evidence of extreme effects. In 1969, the northward migration of gray whales passed near the area contaminated by the Santa Barbara Channel spill, yet the number of gray whales strandings was not sufficiently different from previous years to be attributable to the presence of oil (Brownell, 1971). Gas chromatograph analysis of tissues of one gray whale stranded in the vicinity of the spill did not indicate the presence of crude oil. Observations of whale behavior during this spill indicated that individual gray whales sometimes seemed to avoid some oil slicks and move seaward of them (Winzler and Kelley, 1977).

In addition to potential cutaneous contact with oil or gas, inhalation of toxic substances or plugging of blowholes by oil have been frequently cited as possible threats to cetaceans. Certainly the former is a possibility because whales may be in the vicinity of a spill prior to the evaporation of toxic compounds. The latter, however, seems less

likely. Such an event has never been documented in the scientific literature. Also, the typical breathing cycle of cetaceans involves an "explosive" exhalation followed by an immediate inspiration and an abrupt closure of the blowhole (Geraci and St. Aubin, 1979). This mechanism prevents inhalation of water and should replace the intake of gas condensates and oil; however, toxic hydrocarbon gas could be inhaled. The effects of gas condensate or gas vapor inhalation on cetaceans are not known.

Cetacean vulnerability to hydrocarbon ingestion would vary with species, type of hydrocarbon and nature of the spill. The chance that whales feeding or migrating in the proposed lease areas will come in contact with gas and gas condensate pollutants is small, however, these pollutants may be toxic if ingested. Another potential direct effect, on certain whales, of spilled oil is that of fouling of baleen with subsequent decrease in or complete elimination of feeding efficiency. The probability of such fouling is directly linked to probabilities of spill and whale contact with such spills. Certain baleen whales such as the right or sei, which skim the water surface covering relatively large areas while feeding, would be especially vulnerable to baleen fouling and oil ingestion. It is impossible to predict eventual impacts on endangered populations as a result of such effects at this time.

The greatest potential indirect impacts from oil and gas activities on cetaceans would probably be from the destruction or contamination of critical food sources from acute or chronic hydrocarbon pollution, especially in nearshore areas such as near oil loading terminals or in important offshore feeding areas. Some migratory whales are probably seasonal feeders. These species are thought to rely primarily on the abundant food sources of the North Pacific, Gulf of Alaska, Bering Sea, and Arctic Ocean for the major portion of their food acquisition. It should be noted, however, that some gray whales may not complete the migration north to the Bering Sea and Arctic Ocean, and instead spend the summer feeding along the northern California coast (UC Santa Cruz, 1980, trip reports). In addition, gray whales, although generally believed not to feed during migration, may in fact feed during migration along the California coast. Although food loss or contamination due to oil spills may indirectly stress cetaceans, the extent to which physiological stress resulting from oil pollution may affect cetaceans or interact with other stressors (e.g., non-point source pollution, noise and disturbance, inter-specific social interaction, inter- and intra-specific competition, natural fluctuation in food supply, etc.) is uncertain, and any prediction of stress-related impacts of oil pollution on cetaceans at this time would be premature.

Baleen whales such as blue, fin and humpback whales, could engulf large quantities of oil while catching food concentrations that may be present in an oil spill area. In this case, some of the oil engulfed would probably be forced out of the mouth during the feeding process, however,

oil coating or fouling of the baleen plates could occur. Studies in progress have demonstrated that oil causes matting of the baleen fringes which reduces or eliminates filtering efficiency (Braithwaite, personal communication). The effects of oil ingestion on whales is unknown.

The bottom-feeding gray whale is less likely to ingest surface oils but could be prone to ingestion of hydrocarbons in the sediments of nearshore areas contaminated by acute or chronic oil pollution. Tomilin (1955) reports that cetaceans, especially benthic feeders, have a poorly developed sense of taste, and the presence of foreign bodies in cetacean stomachs attests to this. Thus, evidence indicates that whales may not be able to differentiate between hydrocarbon contaminated and uncontaminated food.

A large oil spill would add stress to an endangered or badly depleted whale population. The blue whale and right whale are probably the most endangered whale species found off the coast of central and northern California. These species are also "restricted feeders" preying on only a few species of plankton. Thus, the blue and right whales probably have the lowest tolerance to increase stress and mortality.

Effects of Noise and Disturbance. Geraci and St. Aubin (1979) reported that high frequency sounds can cause permanent ear damage in laboratory animals and could adversely affect marine mammals. Low frequency sounds are thought to be less destructive. Whether physical adverse effects of sound on cetaceans occur is not known; however, noise does have behavioral and physiological effects on birds and terrestrial mammals (Fletcher, 1971) and possibly certain cetaceans. These effects appear to cause physiological stress involving hormone responses leading to lowering of disease resistance, increased vulnerability to environmental stress, and hormone imbalances which may adversely affect reproduction. Response of animals to acoustic stimuli have generally shown variance in behavioral and physiological effects depending on species studied, characteristics of the stimuli (e.g., amplitude, frequency, pulsed or non-pulsed), season, ambient noise, previous exposure of the animal, physiological or reproductive state of the animal, and other factors. Dependent on such variables, noise could result in changed behavior of cetaceans or affect cetacean communication and/or acoustic sensory capacity.

The very limited field observations of responses of cetaceans to disturbance which presently exist provide some index of sensitivity of whales to oil and gas operations. In respect to the gray whale in southern California, Dohl, et al., (1978:306) concluded "the reasons for this apparent increase in utilization of offshore waters are unknown, but might be the result of increased human activity in the Bight, increased gray whale numbers or some combination of both factors." There are no confirmed reports of the latter species and consistently avoiding exploratory or production platforms, helicopters,

seismic operations or other oil exploration and development activities and many gray whales still use migration routes near the shore despite human activities (Dohl, 1980, personal communication, University of California at Santa Cruz). Geraci and St. Aubin (1979) concluded that species such as the gray whale seem to coexist with small boat and limited air traffic noise.

Cetaceans may attempt to avoid sources which produce sudden, variable pulsed, and/or high amplitude noise. Gregarious toothed whales typically respond to sudden disturbance by sounding, dispersion, and regrouping (Geraci and St. Aubin, 1979, in reference to Leatherwood, 1977). Fraker (1978) observed both aircraft and boat disturbance of beluga whales, a species which may be sensitive to certain types of human activity. Calkins and Curatolo (1979) report that humpback whales, killer whales, and Dall porpoises are disturbed by boat traffic in Glacier Bay. Leitzell (1979) concluded that "uncontrolled increase of vessel traffic, particularly of erratically travelling charter/pleasure craft, probably has altered the behavior of humpback whales in Glacier Bay, and thus may be implicated in their departures from the bay the past two years". Other evidence of humpback sensitivity to disturbance has been reported in its wintering grounds (Norris and Reeves, 1978). However, Payne (1978) listed instances of apparent insensitivity of humpback whales to noise.

Research on effects of noise on cetaceans, particularly that associated with oil operation, is very limited. Measurements of noise from offshore drilling or production activities are sparse, and those which have been made are generally limited to certain frequency bands. A substantial body of literature exists which documents the range of hearing sensitivity of certain species which are relatively easy to study in the laboratory (i.e., dolphins, porpoises, and other small toothed whales) or the characteristics of sounds made by toothed and baleen whales. In general, the available literature shows that the lower limits of hearing sensitivity of small toothed whales are usually less than 1.0 kilohertz (KHZ) and the upper limits are between 75 and 150 KHZ. However, maximum sensitivity bands are quite variable either due to species sensitivity or study environments. Since noise associated with oil and gas operations can occur over a fairly wide frequency band and at intensities audible above ambient noise, cetaceans can probably hear at least a portion of oil and gas activity-related noise. However, this does not necessarily imply that cetaceans will respond negatively to various sound perturbation either in the short-term or long-term. Prediction of behavioral or physiological responses of cetaceans to disturbance and noise will remain difficult, even for those types of disturbance which may consistently be associated with oil and gas development.

Some speculation exists as to the possible induction or contribution to physiological stress on cetaceans which may result from sustained noise

or disturbance. Such an impact could affect reproductive rates, resistance to disease, and endocrine balances of individuals. The extent to which disturbances due to oil and gas exploration and development in the proposed sale area would act as stressor or interact with other potential sources of stress (e.g., direct and indirect effects of non-point source water pollution, intra-specific social interaction, inter- and intra-specific competition, natural fluctuation in food supply, etc.) is uncertain and any prediction of stress-related impacts of noise and disturbance on cetaceans would be premature.

Noise from boat and air traffic and drilling and pipeline activities could also adversely affect cetaceans that are moving through or feeding along the central and northern California because cetaceans rely on their well developed auditory (hearing) senses for communication and respond abruptly to certain noise signals even to their own detriments (Tomlin, 1955). They could experience acoustical confusion, which has been theorized to cause mass strandings (Dudok van Heel, 1966). Because cetaceans and other marine mammals use sound as a form of communication or navigation, background noise from oil and gas activities in the marine environment could interfere with these communications sounds causing social disruption and echo-confusion (Geraci and St. Aubin, 1979). Whether these effects occur or not is not known.

Other potential influences on cetaceans include marine disposal of drilling muds, formation waters, and cooling waters; shoreline alterations; facility siting; dredging and filling; and limited secondary development. The extent of these activities during exploratory phases should not be a major influence on cetaceans. It is not known whether decreased whale productivity could be sustained as a result of loss of habitat or habitat deterioration occurring during development and production phases. Although these effects may be of a localized nature, incremental losses could be significant to the extent that the overall summation of regional effects would deteriorate available or important habitat.

Conclusions: Effects of the proposed sale on endangered and threatened marine mammals are discussed in Section IV.B.2.e. Effects on non-endangered marine mammals due to oil exploration, development, and production activity on proposed Federal areas may encompass the entire range of effects described above. It is possible that the magnitude of such effects would be in proportion to the magnitude of such activities and the relative abundance of species potentially affected. However, due to the relatively small amount of knowledge about present response patterns of marine mammals and the resultant inability to predict future responses of specific non-endangered marine mammals to various perturbations associated with oil and gas development, it would be relatively unproductive to attempt to evaluate the various alternatives (see Section II.B) in terms of their relative merits. In general, it can be concluded that exploratory activities associated with the

proposal will probably not produce noticeable negative effects on non-endangered marine mammals. Levels of noise and oil spill probabilities expected during this phase are comparatively low. If one considers levels of noise from existing vessel and aircraft traffic on the outer continental shelf (see Section III.B.3 and IV.B.2.c), or levels of pollution due to hydrocarbon sources in major metropolitan areas (e.g., Los Angeles, San Francisco, other coastal cities), contributions due to exploratory phases of the sale probably would not create major additional negative effects. However, localized effects due to spills or disturbance associated with supply vessel/aircraft traffic near marine mammal concentration areas such as pinniped rookeries of the Channel Islands during exploration could occur.

During development phases, the effects of noise and human activity will disturb some non-endangered marine mammals. Localized effects of disturbance during development may lead to localized long-term change in population status or distribution of those species of non-endangered marine mammals most likely to occur in the proposed sale area (see Section III.A.2.b). However, many of these species have demonstrated some degree of tolerance to human activity.

Of major concern during production phases would be impact associated with spilled oil. Whether or not long-term low-level chronic pollution associated with the proposed sale would also adversely affect any of the various species is not known.

Cumulative Impacts: Cumulative effects of this sale, other proposed lease sales and other energy development projects which may affect non-endangered marine mammals are uncertain in terms of the types or magnitudes of such effects which may occur throughout the various species' ranges. Regulatory options, such as existing legislation, notices to lessees, OCS operating orders, and stipulation options provide means for administering impacts which may be predicted by future environmental analyses (to be conducted prior to development phases).

d. Birds

i. Impacts on seabirds: Three types of hazards that can result from OCS oil resource development are: 1) the direct effect of floating oil, 2) the indirect effect of ecosystem contamination, 3) direct and indirect effects of increased human activity. Of these three impacting agents, oil spills have proven to cause the most significant impacts on seabird populations.

The detrimental impacts on seabird populations from OCS oil and gas development activities could have one or more of the following effects:

- (a) depression of reproduction
- (b) increased mortality
- (c) decreased availability of food or greater energetic costs of obtaining food
- (d) preemption of habitats.

See Tables IV.B.2.d-1 through -3.

Seabirds have a short breeding season and most breed only after reaching three years of age. Their average clutch size is three or less. They are generally long-lived and have low adult annual mortality rates, under 15 percent (Page et al., 1977). However, if large numbers of a given seabird species are killed during a major oil spill, the high mortality for that year could significantly reduce the reproductive output of the population for several years.

It is not known what level of impact a population may withstand before irreparable damage is done. The Farallon islands seabird populations underwent tremendous population declines, mostly due to commercial egg gathering activities occurring between 1848 and the early 1900s. The number of murre eggs taken in 45 years was well over 1.1 million (Aniley and Lewis, 1974). There may be far-reaching consequences, however, all but two species have returned to pre-exploitation population levels.

Floating Oil. Most of the immediate mortality of birds that come into contact with spilled oil is due to contamination of the feathers. Severe oiling of the plumage leads to mechanical inability to fly or to forage under water, and to lowering of body temperature (hypothermia) by impairment of the normal thermal resistance to cool environmental temperatures afforded by the plumage.

Birds may take in oil during grooming or preening of contaminated feathers. Adult waterfowl are able to adapt and tolerate high concentrations of crude in their diets when not otherwise stressed. However, when experimentally stressed, given seawater to drink and placed in a cold environment (3°C) while being fed food contaminated with 3 percent crude, they died (Stickel and Dieter, 1979). Mallard ducklings fed 2.5 percent and 5 percent crude were stunted and failed to develop flight feathers and slight adverse effects were noticed in

TABLE IV.B.2.d-1

SEABIRD MORTALITY FROM OIL SPILLS

Date, Place	Estimated No. Killed	Dominant Species	Estimated Population Loss
1971-Northern Scotland ^b	2,000-10,000	Murres	10%
1969-Netherlands ^b	35,000	Eiders	
1969-Santa Barbara ^b	3,686 ^a	grebes, loons	
1971-San Francisco ^b	20,000	grebes	
1969-Irish Sea ^b	4,400	Murres	70-80%
1967-Cornwall ^b	40,000-100,000	Murres, razorbills	
1953-Baltic Sea ^b	10,000	eiders, mergansers, scoters	
1955-Elbe River ^b	500,000	scoters	
1937-San Francisco ^b	6,600	Murres	
1966-East England ^b	5,000	gulls, dunlins	
1967-Chesapeake Bay ^c	10,000	grebes, oldsquaw ducks	
1977-New England Coast ^d (ARGO MERCHANT)	540	Murres	
1969-Finland ^c	2,400-3,000	Eiders	25-33%
1966-Danish Archipelago ^f	22,000	scoters	
1956-California ^g	2,900	scoters	
1972-Denmark ^h	30,000-40,000	Eiders	
1975-California ⁱ	5,000	Murres	

^aBirds observed as beach. Figure is not a total estimate of birds killed.

^bWilliams and McGrew (1977).

^cFrom Commonwealth of Virginia, 1976.

^dFrom U.S. General Accounting Office, 1977.

^eFrom Soikkeli and Fritanen. Aqua Fenn. 1972.

^fFrom Bound. Seabird Bull. 1969.

^gFrom Richardson. Murrelet Vol. 37. 1956.

^hFrom Joensan. Reprint from Marine Pollution Bull. 4(8); 117-118. 1973.

ⁱFrom Berkner and Smail. Personal correspondence. 1978.

TABLE IV.B.2.d-2

SEABIRD SPECIES MOST VULNERABLE TO IMPACTS RELATED TO
PETROLEUM DEVELOPMENT

Species	Comments
Migratory waterfowl, loons, grebes	Most are divers and are very susceptible to oiling of feathers; many species forage in large groups in restricted areas of shallow water nearshore.
Cormorants	Very susceptible to disturbance of colonies; roost ashore in large groups and forage in flocks.
Brown Pelican	Endangered species susceptible to oiling of feathers.
Phalaropes	Very numerous and wide-ranging but susceptible to oiling of feathers.
Western Gull	May contaminate eggs by bringing oil to nests on breast feathers.
Nesting Alcids (Cassin's Auklet, Pigeon Guillemot)	Very susceptible to oiling of feathers; gather in large groups near colonies; vulnerable to disturbance of colonies.
Wintering Alcids	Very susceptible to oiling of feathers; may concentrate in restricted offshore areas for feeding.

TABLE IV.B.2.d-3

IMPORTANT OFFSHORE MARINE MAMMAL AND SEABIRD RESOURCE AREAS
SHOWING PROBABILITY OF OIL IMPACT BY SALE NO.53 OVER PROJECT LIFE

Target	3 Days			10 Days			30 Days		
	Prob	Mode	Mean	Prob	Mode	Mean	Prob	Mode	Mean
Pioneer Seamount	0	0	0.0	0	0	0.0	1	0	0.0
Guide Seamount	0	0	0.0	0	0	0.0	0	0	0.0
Davidson Seamount	0	0	0.0	0	0	0.0	1	0	0.0
Rodriguez Seamount	0	0	0.0	2	0	0.0	4	0	0.0
Eel River Canyon	0	0	0.0	0	0	0.0	0	0	0.0
Gorda Escarpment	0	0	0.0	0	0	0.0	0	0	0.0
Gulf of the Farallones	3	0	0.0	9	0	0.1	12	0	0.1
Monterey Canyon	0	0	0.0	1	0	0.0	3	0	0.0
Monterey Bay	0	0	0.0	0	0	0.0	1	0	0.0
Sea Otter Range	9	0	0.1	16	0	0.2	22	0	0.3
San Miguel Island	0	0	0.0	9	0	0.1	11	0	0.1
Richardson Rock	0	0	0.0	14	0	0.1	17	0	0.2
Wilson Rock	0	0	0.0	8	0	0.2	8	0	0.1
Tanner Bank	0	0	0.0	0	0	0.0	12	0	0.1
Cortes Bank	0	0	0.0	0	0	0.0	15	0	0.2

ducklings fed as little as 0.25 percent oil (Stickel and Dieter, 1979).

A number of factors influence the vulnerability of different species of birds to contact with spilled oil. Factors increasing vulnerability include: 1) tendency to form large, dense flocks on the water, 2) existence of certain species only as small populations, 3) considerable time spent swimming on the water, and 4) tendency to dive when alarmed. On the other hand, a species which has the following characteristics is likely to be less vulnerable to spilled oil: 1) foraging done by widely-dispersed individuals, 2) foraging onshore, and 3) a tendency to fly rather than dive when alarmed.

Bourne (1968) has stated that the effects of oil on the various species of birds is usually related to their varying behavior patterns. Species such as gulls, terns, and pelicans are unlikely to plunge into oil deliberately. Shorebirds, for example, sandpipers and plovers, may paddle over it or squat in it on shore, without major effects. However, divers such as loons, grebes and murres are very vulnerable to being oiled.

To some extent, all colonial seabirds are vulnerable to contact with floating oil during the nesting season, since they are concentrated near their colonies during that period, murres being particularly vulnerable.

Generally, shorebirds have not suffered significant noticeable mortality after past major oil spills. Straughan (1971) has reported that, although gulls and terns were the most abundant birds at the time of the 1969 Santa Barbara oil spill, they suffered the lowest mortality. The numerical order for birds in the Channel at the spill time was: gulls, shorebirds, waterfowl, loons and grebes, cormorants and pelicans and other waterbirds. Loons, grebes, ruddy ducks, and cormorants suffered the highest mortality. Therefore, the most abundant bird species in a given area at a certain time will not necessarily suffer the highest mortality after an oil spill. Straughan (1971) observed that many birds appeared to avoid oiled areas after the Santa Barbara spill. Swimming and diving birds were killed in the highest numbers. Chapman (1979) found shorebird population numbers increased and decreased in proportion to oil concentrations on the beaches of the Gulf, as a result of the IXTOX I spill.

Nesting and breeding sites and habitats of the seabirds would be most vulnerable to oil spills during the April to August nesting and breeding season in the central and northern California area. Sandy beaches are important to the least tern and snowy plover. The endangered light-footed and California clapper rails and Belding's savannah sparrow are completely dependent on the salt marsh vegetation habitat for nesting, roosting, and feeding. Visual No. 7 shows the seabird nesting areas along the central and northern California coast.

Although temporary habitat loss to some bird species could occur as a result of a major oil spill, both bird food supply and habitats could also be affected in the long term. Since shorebirds and waterfowl have moderate to high reproductive potential, the effects on these populations may not be significant. Moreover, shorebirds are not as restricted in their nesting and feeding conditions as seabirds (Page, et al., 1977).

Research in cleaning and husbandry techniques by the International Bird Rescue Research Center, J. T. Naviaux, the Research Unit on the Rehabilitation of Oiled Seabirds, P. B. Stanton, and C. Swennen since 1971 has led to the development of a seabird cleaning and rehabilitation technology that has increased release rates to above 50 percent of birds captured in many instances and lowered the time spent in captivity to an average of one week. However, the number of birds captured for cleaning represents a small fraction of the total bird's impacted.

Efforts at oil spill treatment and oil spill cleanup have damaged bird populations in the past. Frequently the emulsifiers used were more toxic than the oil itself and may have been transferred to birds which came to eat fish and invertebrates killed in the treatment area. The new generation of dispersants, while supposed to be no more toxic than the oil by itself, have not really been evaluated in its effect on birds, so the effect is unknown. The dispersants emulsify the oil into the water column and reduce the probability of oiling birds. The effect of new mitigation and cleanup materials and methods will have to be evaluated when used in the proximity of birds in the future.

Increased Human Activity and Disturbance. Acceleration of offshore petroleum resources development increases ship and aircraft traffic near offshore facilities and between those facilities and the shoreline. The intrusion upon isolated areas used by animals for reproduction is also increased.

It is not known how ship or aircraft noise affects birds in or above water. Disturbance of bird colonies on land is a more well-known hazard. Disturbance is much more than an inconvenience to these animals--their reproductive activities may be completely disrupted by human intrusion or aircraft flyovers at critical times. Seabirds react to man by deserting their nests. Human intrusion on nesting areas can lead to crushing of eggs, collapse of underground burrows, and mortality of eggs and chicks due to inter-species predation.

Any attempt to clean up these areas in the event of an oil spill would likely cause more harm to the animals than the presence of oil on land. Anticipated impacts are minor as most of the seabird nesting colonies are not concentrated, but are scattered at locations along the coast. The seabirds of Ano Nuevo and the Farallon Islands are presently protected from human intrusion by a restriction of access to these

islands and the imposition of a 1,000 foot minimum elevation for aircraft flyovers.

Ecosystem Contamination. Contamination of water by pollutants may lead to the loss of critical feeding grounds, decrease in suitable food resources, or decrease in the abundance of prey species.

ii. Conclusions: The potential for oil to impact the birds of coastal, central and northern California depends upon oil spill location size and frequency, the season of the year and species struck by a spill.

Over 75 percent of the estimated 2.24 major and 163 minor spills are predicted to originate from the Santa Maria Basin. These spills are not predicted to go farther north than Point Sur. Proceeding northward, the estimates for the presence of oil and gas go down and so do the risks. The number of nesting seabirds and their colonies in the area of the Santa Maria Basin is comparatively low (Sowles and DeGrange, 1980). Preliminary results of seabird, coastal and offshore distributions show no major areas of significantly dense concentrations. If major spills should occur between Pt. Sur and Pt. Conception, seabird losses would on a state or regional basis be considered as a minor loss. Locally, losses could be heavy. If a spill should enter Morro Bay, bird losses would be especially high.

If a spill from the Santa Maria Basin were to head south, San Miguel Island could be hit (an 11 percent probability). The Asny Storm Petrel, Xantus Murrelet and Cassins Auklets would be vulnerable if spills occurred while these species were present.

There is a 8 percent probability that a spill will strike the Farallon Islands within 30 days after a spill occurs over the life of this project. If a spill should occur during the nesting season and strike this general area, losses to seabirds would be very high. Particularly vulnerable would be the 60,000 common murre who nest there. Seabird losses would naturally be considered high. If a spill should strike the Monterey Bay area, a 1 percent probability, the entire wild population of the Asny Storm petrel would be endangered.

North of San Francisco and the Farallon Islands seabird population remains large with the common murre being the dominant nesting species. If a spill should occur in these areas (less than 0.5 percent probability) the common murre would sustain high localized losses if present when a spill occurred.

The nesting seabird populations from Pt. Sur to San Francisco are relatively low. If a spill should occur (a 20 percent probability along a portion of the San Mateo coast) seabird losses would, on a state or regional basis, be considered as a minor loss. Locally, losses could be heavy. If a spill should enter Pescadero Marsh, losses would be high.

e. Impact on Endangered Species

i. Impact on the Sea Otter: The southern sea otter was listed as a threatened species in 1977 because of its limited range and its vulnerability to oil. If the sea otter makes contact with oil and over 20 percent of its body is covered, then there is a very good reason to believe it will die (Costa and Kooyman, no date).

For purposes of the analysis in this section, spills associated with exploratory OCS activities are not considered to be likely. Increased human activity due to exploratory activities near the southern end of the sea otter range should not cause major adverse effects to the sea otter because most of the increased activities will be at least 3 miles offshore.

During the production phase of development, 2.29 major and 163 minor spills are predicted with over 75 percent of these spills originating from the Santa Maria Basin.

If a spill should occur from P. 8 (see Figure IV.A.1-1), it would probably (21 percent) strike land segment No. 26 (see Figure II.B.7.a-2). Researchers from the University of California, Santa Cruz recently estimated the approximate distribution of sea otters on two occasions, and found that land segment 26 contained about 11 percent of the sea otter population, and contained mostly male sea otters (U.C. Santa Cruz, 1980). If a spill should strike, mortality should be high, approaching 100 percent of the population at this segment. The oil spill model does not predict oil, originating from the Santa Maria Basin, reaching farther north than land segment 21. The model shows a relatively high probability of a strike at land segment 26 and lower probabilities of a strike at segments 25, 24, 22, and 21. No strikes are shown for segment 23. Assuming, as the model shows, that this oil completely covered land segment 26 and partially covered segments 25, 24, 22 and 21, 1/3 of the entire southern sea otter population would die as a direct result of the oil spill.

Woodhouse et al., 1977 (cited in U.S. Fish and Wildlife, 1980) calculates that the sea otter has probably had a growth rate of about 5 percent per year since 1940 (the southern sea otter population was rediscovered numbering about 50 animals in the 1930's, having been believed extinct). The California Department of Fish and Game (cited in U.S. Fish and Wildlife, 1980) estimated 16,000 animals as the potential for California waters. If a spill occurred and killed about one-third of the sea otters, the population would recover within 10 years if the following assumptions are made:

- 1) Growth rate remains at 5 percent,
- 2) Food supply would be available after a spill,

- 3) That the high incidence of males killed at segment 26 would not affect the overall growth rate of the species,
- 4) And most importantly, that no other spills occur.

However, if the last assumption is not met then it would be likely that the continued existence of the species would be in jeopardy.

Cumulative Effects. The southern sea otter was placed on the Threatened Species List because of the threat of an oil spill from offshore oil tankering. With or without Sale No. 53, the threat to the sea otter and its official status will remain until the sea otter's range is significantly increased.

ii. Impact On Cetaceans: The reader is advised to review Section IV.B.2.c for a discussion of the qualitative nature of potential effects which may be sustained by non-endangered and endangered cetaceans as a result of oil and gas exploration and development. The effects associated with exploration, development, and production phases of oil and gas activity on Federal lease areas may encompass the entire range of effects described in Section IV.B.2.c. It is possible that the magnitude of such effects would be in proportion to the magnitude of exploration, development, or production activities. It is possible to place certain potential effects in perspective in terms of their relative impact compared to other factors and how such impacts seem most likely to affect various endangered cetaceans. However, further information would be needed to predict how cetaceans may be affected by the proposed sale on a long-term basis.

In recent years, Northern Pacific right whales have been seen in the lease area infrequently. For example, a 1965 California Department of Fish and Game publication describes only four separate occasions on which right whales were seen off the California coast between 1955 and 1963 (Dougherty, Marine Mammals of California, 1965 edition). Informal consultations with the National Marine Fisheries Service have considered the fact that any impact resulting in the death of a few individual right whales could destroy a year's reproductive effort and reduce the probability of the survival of the species. If the total population of these whales is indeed 200 animals, then a conservative estimate annual recruitment of this species would probably range from 6-12 whales (this assumes only 25 sexually mature females presently extant with one calf produced every other year per female, and a maximum mortality rate of calves at 50 percent). Therefore, to lose a number of whales equivalent to annual recruitment would mean the loss of at least six animals and most likely a number somewhat larger than that. The only known perturbation which is likely to kill six right whales outright would be a large oil spill, assuming a presently unconfirmed sensitivity of whales to direct contact with oil. Such a spill would have to cover a vast area to affect the entire seasonal range of the species. Therefore, although effects on right whales are possible, direct effects

which would endanger this species are not considered likely.

Other endangered cetaceans which may be affected by the proposed sale include the blue, fin, sei, humpback, and sperm whales (see Section III.A.2.b.iv). Effects of the proposed sale on such species are discussed below by major project phase.

Exploration. Due to the presumed low probability of spills associated with exploratory activity (1980 USGS publication), direct or indirect effects of spills on endangered cetaceans during exploration are not considered likely. Also of concern during this phase would be unknown potential effects of noise and human activity and resultant disturbance of endangered cetaceans. Table I.B.2.d-1 (Development Timetable) shows that the most probable average number of exploratory wells which would be operating during any particular year in each basin ranges from one to approximately four (basin totals divided by number of years of exploratory activity), with a most probable maximum number in the Santa Cruz and Santa Maria Basin at six. If delineation wells are considered part of exploratory activity, the average number of delineation wells per year may range as high as 5.5 (Santa Maria Basin; 33 wells/6 years of effort). Thus, in the Santa Maria Basin, the annual average exploratory and delineation wells drilled during exploration is expected to be approximately 9 per year $[(17 + 33 \text{ wells})/6 \text{ years of effort}]$ and comparable figures would be less for the Eel River, Point Arena, and Bodega Basins (total most likely annual average over all basins about 30). No data presently exists to predict the responses of endangered species to the approximately 30 wells drilled per year which are projected to be spread over the entire sale area. The only endangered whale species for which the entire population is known to be exposed to such wells (and any disturbances associated with them) is the gray whale; a species which has increased in recent years despite other sources of disturbance throughout its range. As an example of a single additional source of disturbance which may be as much or more of a threat to cetaceans, Visual No. 2 shows that 28,359 vessel arrivals occur in coastal waters of northern and central California each year (this figure does not reflect arrivals at the major port of Los Angeles, in the southern portion of the range of this species. At least 7,263 marine fishing vessels were registered in California in 1976-1977 (Oliphant, 1979) and probably more than 24,000 marine fishing vessels and boats operate throughout the range of this species in Alaska, Washington, Oregon, and California (U.S. Department of Commerce, 1973: 270). Additionally, large numbers of recreation boats also subject this species to noise effects. Since it is not considered likely that the proposed sale would expose entire populations of most other endangered cetaceans (e.g., fin, blue, sei, humpback, sperm, and possibly right whales) to the extent which gray whales would be exposed to such exploratory disturbances, it is not considered likely that these species would be endangered during exploration in the proposed sale area, assuming these species are no more susceptible to the disturbances than the gray whale. However, localized disturbance of species which have

been identified elsewhere as sensitive to certain types of disturbances (e.g., humpbacks) may occur as a result of exploration. Whether or not the entire population of right whales migrates along the California Coast through the proposed sale area, or occurs in this area, is not presently known.

Development. The most likely potential undesirable consequences affecting endangered whales during development would be effects of disturbance since the maximum potential for disturbance of endangered whales would probably occur during this phase. Such disturbance could result in at least temporary and possibly long term abandonment of habitats in the vicinity of platforms, pipelines, and OCS-related activities. Forced alterations of migration routes and other behavioral responses detrimental to the species could also occur. Drilling noise during the development phase, vessel noise, noise of construction, etc. could all affect whales during the development period. Temporary or development phase-long effects is not expected to be pronounced for transitory gray whales, since they seem able to coexist with at least some noise producing human activity. Whether any other endangered cetacean population which frequents this proposed sale area would be more acutely sensitive to such disturbance and would be adversely affected during the development phase is not presently known.

As a result of marine pollution (e.g., oil spills, drilling mud and cuttings disposal, and other wastes) during development, the entire range of direct and indirect effects discussed in Section IV.B.2.c may occur, and the magnitude of such effects may be in direct proportion to the magnitude of the pollution and number of whales present and potentially affected. Probably of most significance would be cetacean habitat alteration associated with drill cutting disposal. This may cause temporary reduction of benthic organisms possibly utilized by gray whales, but since most of the gray whale population is thought to feed at more northern latitudes, major impacts on this species would not be expected. It is not considered likely that the physical presence of cuttings would affect other endangered whale species. It is not known whether toxic substances introduced into the marine environment as a result of development would adversely affect whales. The proposed sale area is not presently known to be a major feeding area of any endangered whale species. However, the Northern Pacific right whale is thought to range from Oregon to central Baja California during the winter months (Department of Commerce, the Marine Mammal Protection Act of 1972 Annual Report, 1978 edition).

Production Phases. The most likely potential undesirable consequences of production phases would be effects on whales associated with repeated or chronic introduction of pollutants into the marine environment. As a result of marine pollution (e.g., oil spills, drilling mud and cuttings disposal, and other wastes) during production, the entire range of direct and indirect effects discussed in Section IV.A.2.c may occur in direct proportion to the magnitude of the pollution and number of whales

present and potentially affected by it. Since so little is known about the specific types or magnitude of the response of the whales to various direct or indirect effects to oil spills or other marine pollution, no quantitative assessment of potential endangered whale population response can be made at this time. Also associated with production phases would be disturbance and spill effects associated with tankering of petroleum production. Travel of tankers throughout the range of various species may affect whales over a larger region than those activities of the sale area proper. However, it is difficult at this time, if not impossible, to evaluate potential effects of future oil and gas tankering-associated pollution or to compare such effects to those sustained from other sources.

Cumulative Impacts. Cumulative activities related to the present proposed sale, future Federal leases, sales in other areas, State of California oil and gas leasing, and other coastal energy projects have potential for subjecting whales of the North Pacific to a variety of aggregate effects (which may encompass all those described in Section IV.B.2.c), in portions of their winter, spring, summer, and fall habitats. Tankering of crude oil, which may be associated with oil production in other regions may also contribute to cumulative effects. The aggregate total impact of various Federal and non-Federal projects which may be potential factors affecting endangered whales cannot be assessed at this time. The relative significance of the aggregate total impact of the Federal energy project discussed herein, as it may compare to the aggregate impact of other factors which may affect endangered cetaceans (e.g., disturbance from non-energy project vessel and aircraft traffic, disturbance and mortality from subsistence harvest by Alaskan or other natives, illegal harvest, international sources of point and other marine mammals for food or habitat, disease, etc.), is equally difficult to assess.

The proposed sale may only contribute a minor portion of the total cumulative impacts which could result from all the energy development projects discussed here if such effects can be assumed to be in proportion to the size of the area to be leased. The validity of such an assumption is questionable. It may be valid only for prediction of disturbance effects or of chronic, localized oil spill effects, or it may not be valid at all. Future Federal leasing projects in portions of the various species' winter, spring, and fall ranges may contribute to significant overall adverse effects, if all or several projects achieve production phases.

Impact on Other Mammals. The only other endangered mammal which may be affected by the proposed sale and exploratory activity is the salt marsh harvest mouse (see Table III.A.2.c-1). Since this species inhabits non-tidal marshes and is distributed over a relatively large area, oil spills associated with exploratory activities would probably not significantly affect this species.

Impact on Birds. Present concentrations of California's bald eagles are located along inland lakes and rivers, and therefore are distant from impact of oil and gas activities. Therefore, it is not likely that exploration or subsequent phases will have significant impact on bald eagles. Peregrine falcons may occur primarily as transients; also, several nesting sites are located along the coast. This species may be susceptible to impacts of spills or disturbance but the projected levels of such effects during exploration are not considered to be detrimental to the species. Existing cleanup technology and other mitigation measures could also minimize adverse effects on peregrines. Brown pelicans which nest to the south of the proposed sale area may be susceptible to effects of spills but ultimate consequences to the species of such spills is presently unknown. Implementation of OCS operating orders, especially OCS Operating Order No. 7, in conjunction with potential containment of spills, could provide a large measure of protection to this species. The California least tern may be particularly susceptible to oil spill effects in certain essential coastal habitats. Implementation of Oil Spill Contingency Plans and OCS operating orders could provide a large measure of protection to this species. The California Clapper Rail may be susceptible to oil spill effects. However, since this species is found in Elkhorn Slough as well as the San Francisco Bay, and since spills during exploration are not considered likely, exploration activities will probably not adversely affect this species.

Impact on Reptiles. Since the green sea turtle and leatherback sea turtle are only rare visitors or migrate through the proposed sale area, and since the principal range of these turtles is in more southern waters, it is not likely that the proposed sale or exploration activities will affect populations as a whole.

Ongoing and future consultations regarding exploration, development, and production phases of the proposed sale and future lease sales (pursuant to requirements of the Endangered Species Act) may also help identify future impacts and result in additional mitigation of adverse effects on endangered species.

Cumulative Impacts. Future projects such as those designed to limit beach erosion, dredging projects, port improvement projects, the siting of coastal energy facilities, and general urban development all may impact endangered terrestrial or marine mammals, birds, and reptiles. The aggregate consequences of such factors on the various species are unknown at this time.

f. Impact on kelp beds: The activities which could have an adverse impact on kelp beds are pipeline construction and oil spills. If a pipeline were to be routed through a kelp bed, an area 40-50 m (131-164 feet) wide would probably be cleared of kelp. Recolonization after construction would take place within one year unless a competitor were to occupy the substrate prior to the kelp. Recovery would require several years under these conditions. Patches of both situations will occur along the pipeline route.

Studies of kelp beds contaminated by oil spills show that the oil (including diesel fuel) is not likely to cause significant harm to the adult kelps (North et. al., 1964).

The sporophytic generation of kelp is very resistant to damage from spilled oil because of the protective envelope of mucilage and was unaffected during the 1969 Santa Barbara oil blowout. The kelp beds actually protected plants and animals of the lower intertidal by holding oil back until the tide rose over them (Nicholson and Cimberg, 1971).

Even during the oil spill from the wrecked tanker TAMPICO MARU, which involved the more toxic diesel fuel, there was little evidence of damage to the giant kelp Macrocystis pyrifera. The kelp actually increased its density after the oil spill. This increase was attributed to the toxic action of the oil on the animals known to be kelp-grazers, and the subsequent release of grazing pressure on the plants (North et al., 1964).

Kelp has been affected by refined oil under laboratory conditions as reported by North et al., (1964). These toxicity studies were conducted with a diesel oil and showed that a 0.1 percent emulsion nearly inhibits all photosynthetic activity of young Macrocystis blades. Clendenning and North (1960) observed that 10-100 ppm of fuel oils caused a 50 percent reduction in photosynthetic activity of algae in four days.

The damage to the associated kelp bed organisms, especially the epifauna, caused by an oil spill is less well known. Visibility was only three inches in mainland kelp beds during the Santa Barbara blowout of 1969, so accurate determination of damage was impossible. Anderson et al., (1969) could detect no damage to the associated fauna in the oiled kelp beds of Anacapa Island. Apparently, the only response damage to organisms of the kelp bed community was a reduction of mysids (Ebling, et al., 1971). Anderson, Neff, and Petrocelli (1974) reported that the mysid Mysidopsis almyra was the least tolerant to oil of all organisms tested. We do not know if mysids, as a group, are susceptible to the toxins in oil, or if M. almyra is an isolated case within the group. However, other microcrustaceans (amphipods) have been reported sensitive in other areas.

Oil was detained (Battelle, 1970) from reaching shore by kelp beds

during the Santa Barbara blowout. Possibly undetected damage to kelp bed associates resulted, or could have resulted, due to prolonged exposure to the oil.

North (1971) reported that at least the majority of canopy associates are short-lived organisms having a rapid turnover rate. This suggests that, provided brood stock is available from nearby unaffected or slightly affected areas, repopulation and biological recovery would be rapid. This would require several months rather than years.

Destruction of canopy associates also occurs during the harvesting of kelp. This process removes the upper 1.3 meter (4 feet) of the kelp frond.

Prolonged exposure for several weeks over extensive areas of the coast could affect predator populations of fish by decreasing their source of food (see Section III.A.2 for discussion about telescoping the food chain). This exposure could also cause direct mortality to fish and other pelagic canopy associates. The probability of this occurring is probably slight, as it is unlikely oil will remain for so long and over such a wide area. The more expected impact from oil spills is moderate for the associates, with recovery expected within a year or two. A small impact would occur on the kelp plant itself. Impacts to giant kelp associations will be limited to central California, because large forests do not form in northern California.

According to the oil spill model, a maximum of 1.65 spills of 1,000 barrels or greater is predicted in any of the subbasins.

Bull kelp are also covered with a mucilage which should protect it from oil, although we know of no studies to substantiate this. Since this species is absent during the winter at most places on the coast, the most critical time of year for associated species would be during late spring and summer in central California. In northern California, where small forests occur for only short periods of the summer (Section III.A.2) the critical period will be shortened as well as the dependence on bull kelp from associates. In either case, since the bull kelp canopy association is so far less developed than the giant kelp, impacts will be less in magnitude.

An indirect impact to kelp beds which could be related to an oil spill is the loss of sea otters. Sea otters tend to reduce abalone and sea urchin populations in the kelp beds they inhabit. The loss of sea otters to an area would probably allow significant increases in sea urchins, abalones and other shell fish in certain areas. Since sea urchins often forage (feed) on the holdfasts of kelp, an increase in their population could cause a reduction of kelp plants in an area.

The impact of chronic oil pollution on kelp and, particularly its canopy

associates, is unknown.

Conclusion. Central California - Impacts will be small on local kelp plants. However, impact would be expected to be moderate for the associated organisms of the kelp bed.

Northern California - Since large kelp forests do not form here, impact would be expected to be insignificant.

g. Impact on estuaries and wetlands: Impacts expected for central and northern California estuaries are somewhat hard to forecast because most of the historical information comes from other areas and has involved varying fuel oil toxicities. According to Bender et al., (1977) and others, however, severe impacts have been documented when crude oil is spilled on estuarine habitats. In the event of a large spill which completely covers the surface and the flats of the lagoon, and remains for several days, destruction could be manifested for over 10 years. Some species, if endemic, may be permanently eliminated. Artificial restocking of the habitat may also be necessary.

According to Gundlach and Hayes (1978), salt marshes and mangroves, followed closely by sheltered tidal flats such as occur in an estuary, are the most susceptible habitats to oil contamination.

Baker (1971a) reported most marsh seed plants recovered from light single dose coverage by crude oil although leaves were killed, eliminating primary productivity until the following season. Heavy pollution was more damaging when there was sufficient oil to soak into the ground around the base of plants and kill their growing points, causing plant mortality. Penetration of oil into the substratus has direct effects by spreading around root systems and reducing normal bacterial activity or oxygen content. This smothers the shoots of plants such as Spartina which pass oxygen into the soil via their roots.

Evidence has also been presented which indicates growth stimulation of salt marsh plants due to oiling (Baker, 1971b). Causes for this phenomenon primarily involve greater release of nutrients from killed organisms or from oil itself. Perhaps the advantages of increased nutrientification are of little benefit in most estuaries which are sufficiently nutrient rich. However, these studies do demonstrate the necessity of having large quantities of oil covering the area for a time before high mortalities or impacts to the entire salt marsh community occur.

Since the intertidal and subtidal benthic community has such an important role in the overall ecology of an estuary (Carriker, 1967), any event which destroys a large proportion of this community will have a significant effect on other communities in the bay, such as fishes, birds and even terrestrial mammals which depend upon salt marshes for

feeding. The literature clearly indicates that the bottom community of shallow areas having limited circulation and wave energy, such as semi-enclosed estuaries, suffer the greatest impact from oil contamination (Blumer et al., 1970a, b; Sanders, 1977; Sanders et al., 1972; Michael et al., 1975; North et al., 1967; Vandermeulen, 1977; and others).

Once in sediments, oil can remain for years, with its residence time and resulting impact depending upon the wave energy, type of substrate and vegetative cover present, and type of oil. When substrate is heavily oiled, erosion can be increased 24 times. Population densities may continue to decrease for several years before recovery commences. It required two years for Spartina to begin recovery at Chedabucto Bay from a Bunker C spill, according to Vandermeulen (1977).

Recovery from a severe spill, if most species have been eliminated, could involve a successional sequence where preclimax species occupy a habitat, temporarily out-competing the climax species. This could cause recovery to take longer than ordinarily would be required.

According to Shenton (1973), recovery of a mud flat would require over 10 years.

The important salt marsh would be effectively killed for 6 months to a year from a small coverage, but completely killed for an unknown time (until the sediment becomes non-toxic enough to sustain seed germination and sexual maturation) if the coverage is heavy and lasts several days.

The impacts on plankton will vary from minor and quickly recoverable if only a small portion of the water surface were oiled, to severe, if the entire surface were covered for several tide cycles. The larvae of benthic species or fish can be decreased so subsequent years will have small populations of the year-class which was oiled.

The estuaries and wetlands discussed in terms of the oil spill model are within land segments which are predicted to have at least a 5 percent probability of a hit within 60 days. It will be assumed the oil will remain several days which is the most probable case if the amount of oil entering is large. It should be noted that oil diversion equipment could be available near the entrances of the important bay or river entrances to significantly reduce the probability of entrance except in rough seas and extremely large spills. However, it is not known if the equipment will be permanently located in this manner.

Santa Cruz Area. The San Francisco Bay system is the only important estuarine area in land segment 17 which has a 6 percent probability of a hit within 30 days of a spill. It is unknown to what extent a large oil spill will add to the impacts created by already existing pollution in San Francisco Bay. Although it will increase environmental degradation,

the principal cause of environmental alteration will continue to be the existent pollution which has occurred for years. Obviously, if oil were to reach the upper flats and marshes in San Pablo or Suisun Bays, a high impact could result. This is more likely to occur with tankering and unloading for refineries near these upper reaches than from a spill entering from the ocean which would have a lesser chance to reach these more critical areas.

The streams directly tributary to the upper reaches of the San Francisco Bay system are no longer an important spawning area for salmon and trout, but they remain important migration and feeding areas for those species which spawn further upstream. Some anadromous species, such as the striped bass, still spawn in the bay. If oil reaches the upper areas of the system, such as parts of San Pablo or Suisun Bays, significant impacts to resident mud flat and marsh populations as well as to migrating fish populations are expected.

Pescadero Creek (land segment 18) is an important area for steelhead spawning (1,500 fish/year). Although open to the sea during only part of the year, there exists a 20 percent probability of an oil spill hit, with resulting mortality. The oil spill model predicts a 0 to 2 percent probability of a spill reaching the important areas of Bodega, Tomales, and Bolinas Bays, Drakes Estero and Elkhorn Slough.

Santa Maria Area. The only wetland in the Santa Maria area having a 6 percent probability of a hit is the important Morro Bay. This bay would be highly vulnerable to a large oil spill due to the fact that one-third of the area is salt marsh and nearly 50 percent consists of mud flats. These flats support three clams important to sportsmen (Washington clam Saxidomus nuttalli, gaper clam Tresus nuttalli, and the geoduck Panope generosa), as well as Cancer crabs and many fish species.

San Francisco Bay and Morro Bay also support endangered species as discussed in Section IV.B.2.e.

h. Terrestrial plant and animals: Impacts from Sale No. 53 to terrestrial plants and animals are limited to the 2.29 oil spills that are expected to occur, and to habitat destruction from temporary staging areas and 200 miles of onshore pipelines.

If an oil spill should strike shore, terrestrial plants and animals may be killed outright by the spill or inadvertently as a result of cleanup efforts that will take place after a spill. The extent of these impacts should be minor.

The amount of habitat destruction caused by construction of onshore pipelines depends upon the extent existing pipelines and rights-of-ways are used.

Another method of examining potential impacts from OCS Sale 53 is to examine the important estuaries of central and northern California in order to predict the impacts to these areas independent of the oil spill model predictions. The impacts, as stated above, will be high or possibly severe to organisms endemic to a particular estuary (if any such organisms exist) or to certain endangered species (discussed in Section IV.B.2.e.).

As indicated in Section III.A.2.b., 6 percent of the most susceptible habitat, marsh and tidal flats, in central and northern California is located south of San Francisco Bay, with over 90 percent of this in two estuaries, Elkhorn Slough and Morro Bay. Conversely, 27 percent of this habitat is located in estuaries north of the San Francisco Bay complex (San Francisco Bay having 67 percent). Similarly, 62 percent of the important estuaries occur north of San Francisco Bay compared to 37 percent to the south. In terms of impacts to the respective geographical regions should an oil spill cause a high impact to estuaries, there is reason for concern at both regions. In the north the large amount of estuarine wetland is obviously extremely important to the area, both in terms of its ecology, and socially and economically important fisheries. Conversely, the lack of substantial estuarine wetland habitat (except in two estuaries) to the south of San Francisco Bay, is a cause for concern because of the fewer areas to act as a source of brood stock or buffer against significant impacts to the adjacent ocean areas. The ocean areas are partly dependent upon estuaries as biological resource sources.

It becomes clear that it is very important to prevent an oil spill from entering an estuary, particularly during a large spill. There is a greater probability of accomplishing this by diverting oil away from the entrance before the oil slick reaches it than by containing the slick just outside the bay by placing a mechanical barrier (e.g. boom) across the estuary mouth. Diversion of an oil spill away from an estuary may cause the oil to end up at an adjacent intertidal area; however, adjacent intertidal areas may also be important. Another trade-off is that a longer boom, used to divert oil and block a spill from an estuarine entrance, and rapid at-sea vehicles are necessary for its deployment. Oil dispersants may be of use in reducing the size of the slick which could enter an estuary. Oil cleanup methodology is discussed further in Section IV.A.

How successful will the diversion-containment operations be in central and northern California? Many variables are involved in the success or failure of this approach, since the conditions that make boom equipment ineffective are only known in a general way. The physical conditions under which diversion equipment is no longer effective are: water current velocity greater than one knot (1.69 ft/sec), surface wind velocity greater than 30 mph, or wave height 5 to 6 feet or greater.

According to Johnson (1972), only Bodega Bay has a mean opening channel velocity greater than one knot, although several others may have velocities above the critical value during certain periods of the tidal cycle. In testimony from Draft EIS hearings, Brenna Malouf of Grover City cites a Coast Guard representative (Mr. Sutherland) as reporting that current velocities of over 4 knots are typical of the channel entrance into Morro Bay. Summer wind velocities reach 30 mph between 5 and 10 percent of the time in northern California, but rarely do in central California (Ines and Stokes, 1977). Mean winter winds are less than those during the summer, so the periods of winds greater than 30 mph are probably limited to periods of large storms. According to the Bay Area Air Pollution Control District (1970), summer sea breezes reach high velocities (above 30 mph) around San Francisco, particularly the Golden Gate channel area.

Since the openings to estuaries and the protective ability of oil containment-diversion equipment is highly variable, it is necessary to generalize when discussing potential impacts of oil spills on estuarine habitats. With the use of conventional containment-diversion techniques, it is assumed that estuary openings of greater than 100 meters are extremely difficult to protect once oil approaches the mouth. Table IV.B.2.g-1 shows there are 9 estuaries which have "normal" openings greater than 100 meters. Considering the narrowest openings, there are seven estuaries (most north of San Francisco) which may be too wide to prevent an oil slick from entering. During the winter when a combination of flooding and storms tend to cause the widest openings of the year, there are 32 estuaries (22 in northern California and nine in central California) which have openings greater than 100 meters. If 100 meters is too conservative an estimate, there must be an opening too wide to handle a spill. Humboldt Bay, Tomales Bay, Drakes Esteros, San Francisco Bay and the Payoro River have "normal" entrances around 500 meters or larger.

The factor which causes the greatest problem in the control of a spill at an entrance is wave height. The nearshore data is limited, but deep water wave height data (tabulated at 1 degree intervals, 140 observations minimum per interval) is valuable. This is true particularly for diversion considerations, since it is most desirable to divert an oil slick before it has reached too close to estuary entrances. The percentage of observations of waves, 5-6 feet or greater at the most shoreward 1 percent gradients, together with estuaries having "normal" openings greater than 100 meters, are shown in Table IV.B.2.g-1.

The wave height data for the most southern quadrant may be reduced because the protection offered by Point Conception and the Channel Islands dampens the wave height south of the point.

With the possible exception of the Point Conception area, oil cleanup

TABLE IV.B.2.g-1

Percent Observations of Waves Equal or Greater than Five
Feet in Deep Water Near the Coast of Central and
Northern California

Quadrant Degrees N. Lat.	Percent Observations of Waves_ 5 ft		Estuaries with Normal Openings 100 m
	<u>January</u>	<u>July</u>	
41 to 42	76.7	68.7	Klamath River
40 to 41	72.2	70.8	Humboldt Bay Eel River Delta
30 to 40	74.3	64.7	Ten Mile River
38 to 39	67.8	64.1	Bodega Bay Tomaes Bay
37 to 38	64.5	52.9	San Francisco
36 to 37	56.6	49.4	(Elkhorn Slough-100 to 150 m opening)
35 to 36	60.5	50.8	Morro Bay
34 to 35	45.9	42.8	(Point Conception)

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equipment will be functional at a maximum of 50 percent of the time. Waves 5 feet or greater are approximately 10 percent more frequent in the winter than the summer, and there is a gradient reduction in the frequency of large waves as one moves south. Above San Francisco, where most of the important estuaries are located, oil containment equipment will be effective 30 percent of the time in the winter and 30 to 35 percent of the time in the summer. South of San Francisco, oil containment equipment will be effective approximately 35 to 40 percent of the time in the winter and 50 percent of the time during the summer.

Conclusion. A large spill entering an estuary would most probably cause a high ecological loss requiring over 10 years for recovery. The oil spill model predicts a low probability of oil reaching the most important estuaries except San Francisco Bay and Morro Bay (6 percent probability within 60 days). Entrance of oil into San Francisco Bay may not cause the high damage previously described unless it reaches the areas further up in San Pablo and Suisan Bays; Morro Bay and Pescadero Creek (20 percent probability of a hit in 60 days) would experience high ecological damage.

Examining the potential impacts without the oil spill model, a more pessimistic picture emerges. Although northern California contains a majority of the larger estuaries, small estuaries which are highly important to wildlife and the ecology of the area frequent the entire coastline; many (28 of the 47 considered important) estuaries are closed to the sea for various periods during the summer and early fall and will not be subject to oil spill entrance during these periods. Wave conditions and, to a lesser extent other physical conditions, are so frequently severe that from 50 to 80 percent of the time, oil containment will be largely ineffective in preventing oil from entering estuarine habitats.

i. Cumulative impacts on marine and coastal ecosystems: The cumulative impacts of all OCS activities on the marine and coastal ecosystems described previously (IV.B.2) should, in general, be insignificant except in the areas immediately around proposed and existing activities. Changes in plankton population densities and plankton species composition, around oil and gas platforms, should be negligible. However, plankton should show increased population densities around existing municipal sewage discharges and those under construction (such as the major outfall south of San Francisco) due to increased nutrient inputs. The benthos should show no effects of existing and proposed cumulative impacts in any tracts of the four areas except for cumulative effects of drill cuttings and drilling fluids, and municipal sewage discharges. The cumulative effects of the fluids and cuttings will be to reduce the population densities of benthic organisms immediately around the platforms in the short term and to cause possible changes in community species composition in the long term. Formation water is presently discharged at the surface near platforms and shows no effect on benthic organisms. Should discharge of these waters be performed at or near the sea floor, the benthic fauna could be impacted.

The benthic fauna around municipal sewage outfalls is known to show an increase in opportunist detritus feeding species in response to cumulative inputs of organic pollutants. Conversely, a reduction in filter feeding species should be evident. Marine mammal and seabird populations should not be affected significantly by cumulative OCS activities related to oil spills (assuming spill frequency projected by the oil spill model remains valid), cumulative effects of drilling fluids and cuttings or municipal waste discharges. The long term cumulative effects of formation water discharges and noise pollution on marine mammals and seabirds is generally unknown. The endangered and threatened species listed in Table III.A.2.c-1 should not be affected by OCS cumulative impacts with the possible exception of the sea otter. The southern sea otter was placed on the Threatened Species List because of the threat of an oil spill from offshore tanker activities. In the absence of Sale No. 53, the threat to the otter, and its official threatened status, will remain until the populations range is increased. The kelp resources in the proposed lease sale areas may show significant local impacts from cumulative OCS activities. Increases in turbidity due to drilling activities and municipal sewage discharges may combine to reduce the standing crop of kelp in the Santa Cruz and Santa Maria nearshore tracts. Pipeline laying activities may disrupt local kelp beds near pipeline landfalls, but this impact should be both local and short term. No significant impacts are projected for wetlands and estuaries from cumulative OCS activities with the possible exceptions of the upper ends of Tomales Bay and mudflats of Bodega Bay and Harbor. Socio-economic changes in these areas could cause water quality degradation (discussed elsewhere) leading to changes in community structures in these estuarine/wetland habitats. Such cumulative impacts in this area will probably not be realized given the small size of the Bodega Bay tract area and distance from the sensitive areas. The impacts on intertidal and terrestrial plants and animals should not be significant except for local landfall sites where cumulative impacts should be short-term construction impacts in which the areas quickly return to previous conditions. An exception to this should occur near areas of thermal discharge from power plants where more tropical/warmer water species may be introduced in the intertidal, shallow subtidal and terrestrial habitats in and near warm water effluent channels.

In addition, cumulative impacts on marine and coastal resources may exceed a simple arithmetic addition of one impact with another due to synergistic effects which remain unknown or unsuspected at the present level of knowledge.

3. Impacts of OCS development on marine sanctuaries: There are three proposed federal marine sanctuaries and one existing estuarine sanctuary (Elkhorn Slough) in the Sale No. 53 area. The major impacts of OCS oil and gas development activities to these sanctuaries will result from oil spills. Other impacts such as drill rig operation, noise, platform or structure placement, vessel operation, discharge of drilling muds, formation waters and other wastes will generally be insignificant in most portions of the sanctuaries. The oil spill risk analysis model results for proposed Sale No. 53 indicated that there is a greater than 4 percent probability of an oil spill impacting each of the three proposed marine sanctuaries. The probability of an oil spill impacting the Elkhorn Slough Estuarine Sanctuary would, however, be less than 4 percent. This section will discuss the probable impacts on the resources of each of the three proposed marine sanctuaries.

a. Point Reyes/Farallon Islands Marine Sanctuary

The Point Reyes/Farallon Islands proposed marine sanctuary may be impacted by OCS oil and gas development. The probability of an oil spill (cumulative OCS impact) hitting the gulf of the Farallon Islands is 19 percent, and 13 percent for the Farallon Islands. The mainland portions of the proposed sanctuary (land segments 14 and 16) have a hit probability of less than 4 percent (Figures III.A.1-4 and 5 and Table IV.A.1-1, Oil Spill Model Data).

(The following discussion of oil spill impacts resulting from OCS activities was extracted from the Draft Environment Impact Statement on the Proposed Point Reyes - Farallon Islands Marine Sanctuary, March 1980. Published by the U.S. Department of Commerce.)

The most recent instance of severe oil pollution within the Point Reyes-Farallon Island region occurred in 1971 when two Standard Oil tankers collided almost directly under the Golden Gate Bridge, releasing 840,000 gallons of "Bunker C" fuel--a heavy oil mixture used to fuel ships and power plant boilers. Subsequent tidal action washed the asphalt-like oil onto the intertidal shore zones both north and south of San Francisco. As cited in Chan (1973), the California Department of Fish and Game estimated that approximately 7,000 marine birds were affected by the spill and that less than ten percent of these survived. Further analysis of the oil pollution impacts on marine organisms along Stinson Beach and Duxbury Reef determined that smothering was the most important contributor to organism die-off, especially in mussel beds, and to adverse ecological repercussions affecting the reef's complex food web.

Pinnipeds also could have been impacted. Floating oil may adversely affect them in four ways: fouling the fur, ingestion, inhalation, and the irritation of eyes and membranes (U.S. Bureau of Land Management, 1979; Geraci and Smith, 1977). Oil contamination of fur can cause two

very important physical changes--loss of buoyancy and impairment of normal thermal regulation. Of the two, impairment of the body's insulation properties is probably more damaging, particularly for fur seals and sea otters which depend primarily on their fur for insulation (FEIS, OCS Sale No. 48).

Northern fur seals have been sighted in the vicinity of the Farallon Islands in increasing numbers in recent years; in addition, there have been sightings of sea otters along the Marin County coast. These species may be in the process of establishing breeding colonies here, a trend that could be sharply diminished by oil pollution. Although northern fur seals depend only partially on their fur for thermal protection, oiling could depress their thermoregulatory abilities, which could lead to hypothermia (overexposure) and death (Kooyman, et al., 1977).

In general, oil is more likely to be ingested while the animals are feeding or cleaning their coats than by absorption through the skin. The long-term effects of high concentrations of petroleum products has not yet been determined.

Several endangered species of whales, including the highly endangered blue whale, occasionally appear in the study area. The gray whale, also an endangered species, annually migrates through the area. The southern migration includes pregnant females, and the return migration to arctic waters includes young calves. Both these groups may be more susceptible to oil pollution than male adults (Herz, 1979, personal communication). A substantial proportion of the gray whale population could be affected by an oil spill in this area since thousands of animals pass through the study area twice annually.

Although the effects of oil on cetaceans has not been carefully investigated, scientists hypothesize that oil could cause short- and long-term harm (Leatherwood, 1979, personal communication). Because baleen whales are filter feeders, for example, they are susceptible to direct ingestion of oil or oil-tainted substances. Oil has been found to destroy larvae fish, which are an important source of food for some whales and other marine organisms. In addition, oil effects may reduce mammals' ability to find food, to flee from predators, and to adequately care for their young (Herz, 1979, personal communication).

The Point Reyes/Farallon Islands area is characterized by a number of marine bird breeding colonies, including some of the largest marine bird rookeries in the continental U.S. In addition, many migrating species congregate in the offshore regions throughout the year. Impacts due to oil spills and associated cleanup operations would cause the greatest damage when marine bird densities were at their peak. Such densities vary throughout the spring and summer months for different species.

Under the criteria set forth above, the marine birds in this area generally believed to be the most susceptible to oil contamination include murre, guillemots, auklets, murrelets, puffins, loons, grebes, and scoters (FEIS OCS Sale No. 48). Cormorant and alcid populations are also susceptible to exposure largely because of their sizable breeding colonies within the study area. Brown pelicans, observed in somewhat smaller annual populations here, are equally vulnerable due to their more restricted areal distribution, seasonally large breeding assemblages and frequent diving (FEIS, OCS Sale No. 48). Shearwaters, albatrosses, petrels, gulls, terns, shorebirds, and some ducks and geese are all vulnerable to oil contaminants, but in some cases, less so than the diving species (FEIS, OCS Sale No. 48).

Floating oil affects marine birds by fouling feathers and through ingestion, inhalation, and irritation of eyes and membranes. Feather contamination is the primary cause of immediate mortality because of the resulting inability to fly, avoid predators, forage underwater, and the lowering of body temperature due to loss of insulation. Birds may also ingest oil while preening or grooming contaminated feathers, which can lead to death (FEIS, OCS Sale No. 48). In addition, ingestion has been linked to the production of inviable eggs under certain circumstances (Ainley, 1979b, personal communication).

A large oil spill in, or close to, valuable fishing areas adjacent to the Farallon Islands would also pose a potentially serious threat to sport and commercial fisheries, including mariculture. The precise type of impact depends largely on timing with respect to spawning season, migration patterns, on the oil type (solubility, toxicity, etc.), and prevailing weather conditions.

There are three main ways oil spills or chronic exposure can affect fisheries: loss of fishing time or gear; tainting of the fish; and direct destruction of the fishery (Michael, 1977). In the aftermath of a spill, the risk of fouling gear or of catching tainted fish is apt to reduce overall fishing effort; this reduction of effort has a substantial but probably only short-term economic impact. The most serious long-term effect is lingering tainting of stocks (Michael, 1977). Although direct toxic effects on an entire fishery of finfish whose populations cover large areas are not probable, smaller fishery segments can be seriously harmed. Generally, fisheries are most vulnerable during the reproductive and juvenile stages. Many species concentrate in small geographic areas at these times where contaminant concentrations could have serious ecological consequences (Michael, 1977).

The effects of oil and gas activities on kelp, particularly in terms of kelp's role as a habitat for fish, is also important. It is generally believed that the susceptibility of kelp and other plants to oil pollution varies with their life stage, and that the adult kelp

generation has an outer mucilage covering which appears to protect it against oil toxicity (FEIS, OCS Sale No. 48). While there appears to be little evidence to indicate that kelp is harmed by oil, it is an important habitat for fish and fauna which may ingest or come into contact with oil trapped in its fronds.

The intertidal area is an important breeding, spawning, and feeding ground for many marine organisms; the area also provides substrate and suitable habitat for many other species. Oil in the intertidal zone can affect the benthic biota by smothering, fouling, or directly poisoning organisms (Michael, 1977). As a result of the 1971 Golden Gate Bridge oil tanker collision, for example, a significant amount of oil was washed up on the mussel beds and high rocks at Duxbury Reef. Although comparison of pre-oil and post-oil transects showed a significant short-term decrease in marine life after the oil spill, the visible signs of the pollution passed rather quickly. However, oil films pervaded the upper tidepool waters almost a year later and selective evidence of marginal organisms recruitment, e.g., acorn barnacles, was observed (Chan, 1973). Generally, the more mobile forms of marine life (crabs, snails, etc.) suffered greater losses than the sessile organisms, e.g., acorn barnacles and limpets (Chan, 1973).

b. Monterey Bay and Adjacent Waters Marine Sanctuary

While much of the Monterey Bay area would not experience any severe impacts due to oil spills, the seaward limits of the proposed sanctuary area could be exposed to oil spills as a result of the proposed sale. The California sea otter, whose population numbers only about 1,500, is distributed between Pismo Beach and Santa Cruz, an area which includes the proposed sanctuary. This species is listed as "threatened" by the U.S. Fish and Wildlife Service because of the populations vulnerability to oil pollution.

The oil spill model run for the proposed sale revealed that there was less than a 4 percent probability of an oil spill reaching state waters in segment-sector Nos. 19, 20, 21, 22 and 23. (Table IV.A.1-1, Oil Spill Model Data). Areas of sea otters habitation could, however be impacted to a greater degree. In the cumulative impact case, the probability of an oil spill impacting the sea otter range is 29 percent. the oiling of sea otters can prove to be fatal since they are dependent upon their underfur for insulation. Oil tends to reduce this insulation which causes heat loss, hypothermia, followed by death due to pneumonia. (See Section IV.B.2.c for a detailed discussion of the impacts of an oil spill on sea otters.)

c. Channel Islands and Santa Barbara Island Marine Sanctuary

The proposed marine sanctuary in the Channel Islands may also be

impacted by OCS oil and OAS activities. While the probability of an oil spill hitting Santa Rosa, Santa Cruz, Anacapa, and Santa Barbara Islands in less than 4 percent. San Miguel could be impacted more severely. Under the cumulative impact case, the probability of an oil spill impacting San Miguel is 34 percent. Richardson and Wilson Rock could also be impacted, with the probability of such an occurrence being 41 and 34 percent respectively.

The waters around the northern Channel Islands support a large and varied array of significant resources, such as the largest and most diverse temperature water pinniped community in the northern hemisphere. Additionally, about 40 percent of all the kelp beds in the southern California Bight occur around the Channel Islands. The impacts on these and the other resources of this proposed sanctuary are similar to those previously mentioned which would be associated with the Point Reyes/Farallon Island proposed sanctuary. (Also see Section IV.B.2)

d. Conclusions

If proposed Sale 53 were held, it would not prevent the establishment of any of the proposed marine sanctuaries, or the maintenance of the existing estuarine sanctuary in its present condition. Any potential impacts to these sanctuaries would come, primarily, from oil spills. The probability of any of these areas being hit is very low, less than 4 percent in most areas. Anticipated impacts would not significantly alter the character of any of these areas.

Cumulative Impacts. Important cumulative impacts are primarily those associated with oil spills. The cumulative probabilities of an oil spill hitting the Gulf of the Farallons is 19 percent, 13 percent for the Islands themselves. Mainland portions of this proposed sanctuary (Pt. Reyes - Farallon Islands) have hit probabilities less than 4 percent. With the Monterey area (Monterey Bay and Elkhorn Slough sanctuaries) cumulative oil spill hit probabilities range up to 29 percent within 30 days. For the proposed Channel Islands sanctuary, cumulative probabilities are as high as 41 percent for specific sections, like Richardson Rock. Most areas have much lower probabilities. The cumulative impacts upon the three proposed sanctuaries and one existing sanctuary could result in an alteration of the character of these areas.

4. Impacts on Commercial Fisheries

Oil Spills. The greatest impacts on commercial fisheries probably will be from oil spills. It is unlikely that commercial fishermen will harvest in the area of an oil spill because: 1) their boats and gear may be contaminated, 2) they may be confined to port by oil containment booms and 3) direct coating and incorporation of petroleum hydrocarbons can cause tainting of commercial organisms, rendering them unmarketable. Also, oil can affect fish (and other marine organisms) by 1) direct lethal toxicity, 2) sublethal disruption of physiological or behavioral activities, 3) direct coating, 4) incorporation of petroleum hydrocarbons into the organism, and 5) habitat alteration. The last four can lead to the eventual death of the organism. If numerous sexually mature animals are killed, the size and reproductive potential of the population (and available stock) will be significantly reduced. Biological damage from an oil spill can range from light to nearly total devastation (Blumer and Sass 1972; National Academy of Science 1975). The amount of biological damage will depend on many factors including: 1) physical and chemical characteristics of the oil, 2) the amount of oil, 3) environmental conditions such as sea state, temperature, salinity, and 4) the biological characteristics of the organisms, life stage, season, and previous exposure to oil.

The effect of petroleum on the ecology of fishes, and most other marine life, is not well known. However, it has been shown that:

- (1) Eggs and larvae may die in spawning or nursery areas due to coating or direct toxic effects. Hufford (1971), Mironov (1969) and others reported that crude and bunker oils were toxic to fish eggs in concentrations of 1 ppm. Also, major behavioral abnormalities are reported in larvae at levels of 0.001 ppm. Larvae simply sank to the bottom and remained inactive. Sensitivity to oil generally diminishes from eggs, to larvae, to fry, to adults.
- (2) Adults may be killed from direct toxic effects or indirectly as a result of maladaptive behavior. For example, significant mortalities occurred when coho and sockeye salmon were exposed to crude oil concentrations of 500 ppm (Morrow 1974). Behavioral changes could include loss of equilibrium, inability to school, and reduced swimming activity.
- (3) The reproductive output of adults may be affected. Strusaker (1976), studying changes in the fecundity of anchovies and striped bass, found that they rapidly take up benzene into the ovaries, causing a marked reduction in the viability of the resultant eggs.

To increase our knowledge of these effects, BLM is conducting a central and northern California commercial and sport fish oil toxicity study. Since most oil remains at the surface, species which occur in the surface layer are the most vulnerable to impacts from oil. Many species have egg, larval, and juvenile stages which inhabit the surface layer and are susceptible to oil. If a very large number of these stages were killed, the population would be significantly impacted. However: 1) the egg, larval and juvenile stages of most species occur over a much larger area than the oil would contact; 2) the oil spill may not occur at the time of year these stages occur in the surface layer; and 3) even if the oil spill does occur during the time these stages are in the surface layer, the oil probably will not remain in the water in significant concentrations for very long, so that reproductive stages subsequently reaching the surface layer could survive. Nevertheless, the possibility that a population, at least for one year class, could be significantly impacted due to oil affecting the egg, larval or juvenile stages should be recognized.

If numerous sexually mature animals are killed, both the size and reproductive potential of the population will be directly reduced. Thus, species whose adult stages are concentrated near the surface at the time of the spill may be significantly impacted. There are too many variables to accurately predict these impacts, but low to moderate ecological losses could occur (see definitions in Section IV.B.2).

Oil may also have a significant impact on salmon and other anadromous fishes (see Fry 1973) that use chemical cues to return to their native streams to spawn. Since oil could interfere with their ability to detect these natural cues, these fishes are particularly vulnerable to oil in the sea when they first enter the sea as young and later when they return to spawn. Field tests have shown (Malins 1980) that salmon will initially avoid a contaminated fish ladder but later some will use the ladder despite higher levels of hydrocarbons. Also, salmon have been shown to avoid oil in laboratory experiments (Rice 1973). Therefore, oil contamination of estuaries and streams probably would prevent some anadromous fish from returning to their native streams to spawn. In the case of a large spill reaching an estuary, such contamination could reduce the runs for a period of 5 years or more, resulting in high ecological losses. Even in the Eel River Basin where no recoverable oil is expected to be found, kerosene range hydrocarbons, if released by a gas well blowout, could have similar adverse effects.

Many other species use estuaries as spawning or nursery areas. If a large spill occurs and oil gets into an estuary and stays for several tidal cycles, there would be high ecological losses to these species as well (see discussion in Section IV.B.2.g).

Reduction in the population size of one species may significantly affect other species in the food chain. For example, many species feed on

northern anchovies. If the number of anchovies is substantially reduced, their predators may need to switch to another food source, if available, to survive. Consumption of this new food source could affect its population size as well. Conversely, reduction in the number of anchovies means the population size of the species it feeds on could increase. The marine food web is extremely complicated and it is not possible to assess how significant the reduction of one species due to Sale No. 53 will be to others. However, the fact that population sizes are interrelated needs to be recognized. The complexity of the marine food web as it relates to management of multispecies fisheries is discussed by May, et al. (1979).

The economic impact of oil spills on commercial fishermen during the entire life of the project is extremely difficult to assess. If it is assumed that a spill greater than 1,000 barrels would cause a 10 percent reduction in salmon landings for five years (10 percent probably is the smallest amount that will be distinguishable from annual variations in catch), the potential impact on commercial fishermen for salmon alone for each basin can be estimated by multiplying the 1976 value of salmon landed at ports near each basin times 0.10 (for the 10 percent reduction), times five (for 5 years), times the number of expected spills in each basin. The expected number of spills greater than 1,000 barrels is less than one for all basins except the Santa Maria Basin. The estimated losses are:

\$ 0 in the Eel River Basin although kerosene range hydrocarbons, if released by a gas well blowout, could have similar adverse effects,

\$113,000 in the Pt. Arena Basin,

\$ 61,000 in the Bodega Bay Basin,

\$585,000 in the Santa Cruz Basin and

\$292,000 in the Santa Maria Basin.

Data from 1976 were used because 1976 is the most recent year for which these data are available. Inflation and changing market conditions probably will cause the value of the losses to be greater.

Economic losses also could occur if there are decreases in the population sizes of species whose adults are concentrated at the surface at the time of the spill, but these cannot be estimated. Since it is unlikely that fishermen will harvest in the area of an oil spill, there could be additional losses to those who fish for other species, but most fishermen probably will be able to fish other areas. Economic losses also would be incurred by support, processing, transportation and marketing industries.

Mitigation is provided by OCS Order No. 7 which requires that each oil company develop oil spill contingency plans and have ready access to pollution-control equipment. For large spills these measures will probably have minimal effectiveness since rough seas frequently occur in the proposed lease area. Formulation of new oil spill cooperatives in the future may further mitigate these impacts. The other OCS orders are intended to reduce the likelihood of oil spills; however, these measures will not reduce the estimated losses noted above since these losses are based on the predicted number of oil spills over the life of the project. The Offshore Oil Pollution Compensation Fund was created to compensate for these and other losses (see Section I.B.7.b). Since this Fund is new, its effectiveness cannot be evaluated.

Manmade Structures. Conflicts between commercial fisheries and manmade structures can occur offshore and onshore. Offshore conflicts can result in lost fishing space, time and gear or disruption of critical habitats whereas onshore conflicts can result in competition for berthing spaces and support services.

In central and northern California, the fisheries most likely to have significant conflicts with offshore structures are the trawl fisheries (see discussion in Centaur Associates, Inc. 1980). Surface structures such as drill ships or rigs, platforms, storage and loading systems and floating production systems will preclude fishing where they occur and in a surrounding buffer zone. The size of this buffer zone will depend on several factors including vessel maneuverability, fishing vessel operating characteristics, gear placement and control, effect of weather and sea conditions, legal and safety requirements, bottom topography (trawlers follow depth contours), a fisherman's experience, and his willingness to trawl near OCS structures. Additional space could be lost to fishing due to a configuration of platforms and associated subsea structures. However, in general this should not present a problem beyond that associated with the sum of individual platforms because turning radii of otter trawlers are typically of the same order of magnitude as the buffer distances (Centaur Associates, Inc. 1980).

Subsea structures also conflict with trawlers. Structures such as subsea production systems and subsea completion systems preclude fishing space similar to surface structures. However, the buffer zone around these subsea structures will also be affected by the navigational accuracy with which a fisherman can know his position relative to the obstruction.

If fishermen know the location of offshore structures, they will avoid these structures unless there is good reason or financial pressure to fish close to them. In general a minimum radius of 500 feet of fishing space will be lost around each surface structure or subsurface structure marked with a buoy that is located in central and northern California (Centaur Associates, Inc. 1980). Other subsurface structures for which

the locations are known but not marked with a buoy will preclude a minimum radius of 1,200 feet of fishing space due to navigational accuracy, except pipelines should not preclude fishing space except at irregular surfaces since they usually are not avoided. In general, a maximum radius of 1,320 feet may be lost around all offshore structures if fishermen choose to observe the payment criteria of the Fishermen's Contingency Fund (see Section I.B.7.c), or during placement and maintenance of the structures. However, a mooring type of drillship could have anchors which extend an approximate distance of three to eight times the water depth of the well (although this will be in place for only a few months) and guyed tower platforms, if used, would preclude more fishing space than tension-leg or conventional platforms.

The total fishing area that will be precluded by OCS structures is very small. Multiplying the number of platforms, offshore storage and loading facilities, subsea production systems, floating production systems, and subsea completion units predicted for each basin times the area that would be lost by a 1,320 foot radius buffer zone and dividing by the total area for each basin yields the following percent fishing area lost: Eel River Basin 0.3 percent, Pt. Arena 2.3 percent, Bodega Bay 0.6 percent, Santa Cruz 0.5 percent, and Santa Maria 0.7 percent. These calculations do not account for space precluded by drilling ships and rigs, the heterogeneous distribution of fish populations and fishing effort nor the tendency of fishermen to fish along depth contours. Even when these factors are considered, the total fishing area lost will be very small, and there probably will not even be a detectable loss in catch. Nevertheless, these structures will be a nuisance to fishermen. At the same time, surface structures can provide benefits as navigational aids, and emergency help in case a vessel is disabled or a crewman injured.

Often, fishermen will approach close to an offshore structure because fish are attracted to them. It is likely then that at least one net will be lost on one out of every five subsea production systems and subsea completion systems. Assuming total net loss (although the net may only be damaged), the loss per basin, including the cost of lost fishing time, is estimated to be: Eel River \$10,000, Point Arena \$60,000, Bodega Bay \$0, Santa Cruz \$20,000 and Santa Maria \$40,000. The Fishermen's Contingency Fund will not compensate for these losses since these structures will be mapped.

It is important that pipelines be compatible with fishing because they often traverse a large area. OCS Order No. 9 requires that pipelines be installed and maintained to be compatible with trawling operations (see Section I.B.5). How this is to be achieved will be decided for each case separately before the pipeline plan is approved (see Section I.B.7.g). When pipelines are buried, they create little conflict for fishermen. However, environmental conditions can cause these pipelines to become unburied, and nets can snag on valves, anodes

or other irregular surfaces of unburied pipelines. In deep water or rocky bottoms such as occur in much of central and northern California, it is unlikely that it will be feasible to bury pipelines. As pointed out by the proposed Wells and Pipeline Stipulation (see Section I.B.6.g), unburied pipelines will need to have smooth surface designs and some type of protection over irregular surfaces to be compatible with fishing gear. In southern California, pipelines have had little conflict with commercial fishing. However, when one pipeline was laid, mud mounds were created by the barge's anchors and these mounds are interfering with trawling operations. One possible solution suggested by the local fishermen is to pull a heavy chain over the mounds to break them up.

The subsea structures which potentially can cause the most significant conflicts are temporarily abandoned subsea wellheads (also called temporary abandonments and casing stubs) and debris because the fishermen often do not know they exist and, therefore, they cannot avoid these objects. A snag on a subsea structure will usually result in lost fishing time and gear damage. Sometimes, the gear is totally lost or may need to be cut loose if it cannot be released. OCS Orders No. 1 and 3 require that the U.S. Coast Guard District Commander determine what aid to navigation devices are needed for subsea wellheads that are hazards to the deployment of commercial fishing devices. The proposed wells and pipeline stipulation require that subsea wellheads be protected, if feasible, to be compatible with commercial trawl gear. These measures reduce the conflicts. However, in southern California, snags on subsea wellheads have occurred because the fishermen did not know these objects existed. Attempts have been made to provide the location of these structures, however, most fishermen navigate with Loran C coordinates and these typically have not been provided. In the future, information on the location of obstructions should be more readily available through the programs established by the Fishermen's Contingency Fund (see Section I.B.7.c). Also, only about 2 percent of the exploratory wells will be temporarily abandoned compared to about 10 percent five to ten years ago. In the past, more wells were temporarily abandoned and left in that state for many years because the oil companies felt it was necessary to do so to maintain their leases. This is no longer necessary and temporary abandonments probably will be only short-term until development can proceed. Nevertheless, one net may be lost on each temporarily abandoned subsea wellhead. Assuming 2 percent of the exploratory wells are temporarily abandoned and assuming total net loss (although the net may only be damaged), the loss per basin including the cost of the lost fishing time is estimated to be: Eel River \$0, Point Arena \$0, Bodega Bay \$0, Santa Cruz \$10,000, Santa Maria \$10,000. The Fishermen's Contingency Fund will not compensate for these losses if the locations of the obstructions have been published.

Debris dropped overboard will interfere with trawling operations. OCS Order No. 7 prohibits the disposal of any waste material which will

adversely affect commercial fishing except under emergency conditions. However, some materials will be dropped overboard, particularly in bad weather. OCS Order No. 1 requires that any equipment that could be expected to interfere with commercial fishing gear be marked, wherever practicable, with the owner's identification so that fishermen can seek compensation from the appropriate parties. If the responsible parties cannot be determined, the Fishermen's Contingency Fund usually will compensate for the losses (see Section I.B.7.c). However, applying for reimbursement from this fund places administrative burdens on the fishermen and compensation may not be received for several months. It is preferable that the debris never be dropped overboard or that it is cleaned up. BLM is conducting a trawl study to assess the size and quantity of debris that interferes with trawling in an area where exploratory drilling operations have recently been completed, and the feasibility of removing this debris by systematically trawling the area.

Offshore manmade structures also can cause disruption of critical habitats, particularly during placement. Within the Eel River Basin are several tracts which overlap the Dover sole and Petrale sole spawning areas (see the Commercial Fisheries alternative). If these spawning grounds are disrupted, the reproductive capabilities of these species could be reduced causing a severe impact on the populations and commercial fisheries for these species. In 1976 over \$1.5 million worth of these species were landed in Eureka. Additionally, it has been suggested that unburied pipelines could interfere with the seasonal migration of the Dungeness crab. If this is true, this could significantly impact the population and fishery.

Onshore, competition between the oil and gas industry and commercial fishing industry can occur for berthing spaces and services. The significance of these impacts will depend on the port. A study of conflicts onshore and offshore entitled "Assessment of Space and Use Conflicts on the U.S. Outer Continental Shelf Between the Oil and Gas Industry and Commercial and Recreational Fishermen" will be completed in early 1981. In their interim reports, Centaur Associates, Inc. (1980) discuss the factors which determine what conflicts can occur for onshore facilities. Six ports in northern and central California, chosen to roughly represent all ports in the proposed lease area, will be included in their final detailed analysis: Eureka, Fort Bragg, Bodega Bay, Moss Landing, Morro Bay, Port San Luis (Avila). Unless the commercial fishing industries' interests are carefully considered before a port is used by the oil and gas industry, significant impacts to the commercial fishing industry could occur.

Discharges and Effluents. Several types of discharges and effluents could be released during OCS oil and gas activities. OCS Order No. 7 prohibits disposal of any waste materials into the ocean that will create conditions which will adversely affect aquatic life or commercial fishing. Disposal of waste materials is regulated by the Environmental

Protection Agency. Of particular concern are drilling muds because very little is known about their long-term, chronic impacts. There are indications that these muds could produce elevated trace metal concentrations in marine organisms and interfere with reproductive processes (see discussion in Section IV.B.1.b). These effects could cause significant impacts to fish and invertebrate populations and their fisheries especially when there are important spawning areas within the lease tracts (e.g. the Dover and Petrale sole spawning grounds in the Eel River Basin) or when the fishery is limited and a significant part of that fishery occurs within the lease tracts (e.g. the spot prawn fishery in the Santa Maria Basin). These potential impacts could be avoided if drilling muds are required to be barged to shore instead of being released into the ocean.

Vessel Traffic. Increased vessel traffic will cause some conflicts between the oil and gas industry and commercial fishermen. Supply and crew boats probably will be the most frequently encountered. The greatest conflicts may occur with seismic boats since they pull a 2 mile long cable behind them precluding fishing in the area. Gear set in place could be lost if fishermen do not receive adequate notice that a seismic boat will be in the area. Also, fishermen have found that after a seismic boat passes through an area, sonar shows the fish move to the ocean bottom and subsequently no fish are caught. In some areas this may be a long-term effect. Reimbursement for gear damage may be available from the Fishermen's Protection Act which is described in 50 CFR Part 258 (see the Federal Register Vol. 44, No. 208, pages 61546-61551, October 25, 1979, and Vol. 45, No. 53, page 17018, March 17, 1980). Since this act is new, its effectiveness cannot be evaluated.

Mariculture. None of the mariculture industries are anticipated to be impacted by the proposed Sale No. 53 operations since they do not occur within the tracts and the probability of an oil spill reaching them, based on the oil spill model, is very low. However, if oil reaches mariculture operations, they would be impacted similar to other commercial fisheries. The organisms would not be marketable due to tainting even if they lived through an oil spill. Equipment coated with oil would need to be replaced. Additionally, since they have less mobility than other fishermen, mariculture farmers could be forced out of business. Mitigation and compensation for oil spills would be the same as for other fisheries (see discussion above). Potentially, platforms may be used for mariculture operations.

Conclusions. The greatest impacts on commercial fisheries probably will be from oil spills. Low to moderate ecological losses could occur to surface fishes and high ecological losses could occur to salmon and other anadromous fishes. Conflicts between commercial fisheries and manmade structures can occur offshore and onshore. Offshore, the fishing area that will be removed will be very small and there probably

will not even be a detectable loss in catch, however, some nets and fishing time may be lost due to snags. Offshore, manmade structures also may cause disruption of Petrale and Dover sole spawning grounds in the Eel River Basin which could severely impact the fisheries for these species. Onshore, careful consideration will need to be given to the commercial fishing industries' interests in order to avoid significant impacts to the commercial fishing industry. Disposal of any waste material into the ocean that will create conditions which will adversely affect aquatic life or commercial fishing is prohibited by law, and is regulated by the Environmental Protection Agency. However, drilling muds could significantly affect fish and invertebrate populations and their fisheries especially when there are important spawning areas within the lease tracts (e.g., the Dover and Petrale sole spawning grounds in the Eel River Basin) or when the fishery is limited and a significant part of that fishery occurs within the lease tracts (e.g., the spot prawn fishery in the Santa Maria Basin). Increased vessel traffic will cause some conflicts, particularly seismic boat traffic. Mariculture industries are not anticipated to be impacted but would suffer high economic impacts if oil reached them.

Cumulative Impacts. The cumulative impacts of the proposed lease sale and other activities will create additional stresses to the struggling fishing industry. The proposed lease sale will add to the probability of the occurrence of a major oil spill and will increase chronic, low-level discharges of pollutants which may significantly impact the populations and commercial fisheries. The proposed lease sale also will increase space-use conflicts offshore, conflicts for port facilities, and vessel traffic conflicts. These cumulative impacts probably will cause significant impacts to the commercial fishing industry. The salmon fishery is particularly subject to adverse cumulative impacts because salmon populations also are stressed from habitat degradation of their freshwater spawning streams. On the positive side, the proposed lease sale will provide additional navigational aids and locations where emergency help can be obtained in case a vessel is disabled or a crewman injured.

5. Impacts on Recreation and Sportfishing. Recreation is a very personal activity in that what might be a thoroughly enjoyable recreational activity to one person, might be completely boring and unacceptable to another. Thus, the effects of the impacts on recreation tend also to depend on the activity being furnished, the area impacted, and the size or quantity of the impacting agent. Therefore, this analysis shall deal, in detail, only with impacts on the major recreational areas and the associated local economies on a worst-case basis.

An impact on recreation will be noticed where oil spills contact the shoreline in the form of oil-tainted beaches. An impact could also be noticed offshore in areas of recreational boating, and in the underwater parks (see Figure III.B.2.a.i-1). If large quantities of oil entered the coves, damage to marine life could occur, and all water contact and general beach use activities would tend to be stopped until the cleanup was completed. The general impact of oil spills on harbors, ports, and marinas will be a reduction in the amount of boating, which takes place at that particular harbor, and could mean the closure of the harbor by a boom to prevent oil from entering and contaminating the hulls of the boats.

Manmade structures are listed and discussed in Section II.A.2. The impact on recreation will be according to the structure involved. Offshore structures will impact recreational boating. Pipelines will impact beach use and surf zone areas where they contact the shore. The duration of pipeline installation through the beach zone will be 1 to 10 weeks during which time a section of the beach will be closed. When work is completed, the first high tide will remove all traces of work on the intertidal zone and the first storm will erase marked areas from the upper beach if the pipeline is buried (see pipeline stipulation Section I.B.6.f.). In this case, the beach would have then returned to its original state. However, if there is a necessity to cover the pipeline with riprap through the surf zone, there will be a negative impact on surfing and sightseeing, yet a positive impact for sport diving, as there will tend to be an aggregation of crustaceans due to the structural porosity of the riprap. (A pipeline at Padre Island National Seashore, Texas, closed 1,200 to 1,500 linear feet of shoreline to public use for 2 to 3 weeks, but the burial of the pipeline offshore tended to attract sport fishermen.) Onshore facilities will impact any recreational facilities in the immediate vicinity, however, this can be lessened by locating these facilities in existing commercial areas where feasible.

Vessel traffic will have a minor impact on recreational boating due to the increase in vessels in the area with the introduction of work boats, crew boats, barges and tankers.

Noise will be noticeable during all stages, but mainly during development and abandonment when construction and teardown are taking place.

Lower levels of noise will be found during the entire life of the sale area from such sources as helicopters flying to and from the offshore platforms, and the increased number of boats operating in the area.

The aesthetic disturbances will be the noises previously mentioned, the change of the skyline by the introduction of structures, and also the changes on the beach due to the facilities being situated in previously pristine areas, or adjacent to, or in the vicinity of recreational areas. The aesthetic impact will also be seen where pipelines come ashore, as any riprap covering, if used, will be visually unappealing, and will form an artificial barrier across the beach. Additionally, there will be an earth scar which will last for a considerable length of time, onshore along the pipeline right-of-way. (For an additional discussion of visual resources, see Sections III.B.8. and IV.B.11.)

Changes in economic activity are found in the Harris Model as projections over the expected life of the sale area. The impact on recreation for the California coastal counties is a general increase in demand, caused by the expected expenditure on recreation. The trend is expected to be an increase in recreational aspects to the year 1995 and then a slight dropoff until 2005. This trend tends to follow the expected production aspect of the sale area with a peak in 1990 and slowly tapering off to abandonment in 2005 (see Table IV.B.5-1).

Tourism is the second largest industry in the sale area. Because much of the tourism is dependent upon water-oriented recreation, an oil spill could have a considerable impact on the industry. In the event of an oil spill impacting the coast, the effect on the tourist industry will depend on the extent of the spill and partly on the news media. If the publicity was "non-dramatic", the cost to the tourist economy would be localized and lessened. However, if the event is dramatically publicized and becomes a highly emotional issue on the national level, it will tend to have a major impact on tourism. This was seen in August of 1979 when the economic impact of the Ixtor I oil spill hit the Texas beach communities approximately two weeks before the major pollution impact. Also, this was noted by the French government in the summer of 1978 after the Amoco Cadiz spill, where tourists stayed away from the Brittany Coast, including those areas which had not been impacted as well as those which had been cleaned. The feeling was also presented by a representative of the Brownsville Texas Chamber of Commerce who said he felt the media impacted the tourist industry in Brownsville more than the oil spill. Representative figures of the impact on the tourist industry of the South Texas Coast are seen Table IV.B.5-2 in relation to the distance from the impacted area. By using this table in conjunction with Tables III.B.2.a.i-4 and 5, and a suitable formula, it is possible to determine a feasible maximum economic cost to any of the Coastal counties under the "worst case" oil spill as none of the basin are expected to have reserves under pressure which could produce a spill at

TABLE IV.B.5-1

EXPECTED PERCENT CHANGE IN RECREATION INDUSTRY

	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>2000</u>	<u>2005</u>
Eel River					
Demand	<1 ^a	2.4	4.0	5.6	7.2
Supply	<1	1.8	3.2	4.7	6.0
Personal Expenditure	1.2	2.8	4.6	6.4	8.1
Point Arena					
Demand	<1	3.1	3.4	2.6	2.2
Supply	<1	<1	<1	<1	<1
Personal Expenditure	1.1	4.0	4.8	3.7	3.2
Bodega Bay					
Demand	<1	<1	<1	<1	<1
Supply	<1	<1	<1	<1	<1
Personal Expenditure	<1	<1	<1	<1	<1
Santa Cruz					
Demand	<1	<1	<1	<1	<1
Supply	<1	<1	<1	<1	<1
Personal Expenditure	<1	<1	<1	<1	<1
Santa Maria					
Demand	<1	1.8	1.3	1.1	<1
Supply	<1	1.6	1.6	1.4	1.3
Personal Expenditure	<1	1.6	1.5	1.2	1.0

^a<1 = less than 1%.

Source: Harris Model.

TABLE IV. B. 5-2

CHANGE IN TOURISM ON TEXAS COAST DURING IMPACT OF IXTOC I OIL SPILL

	1977	% Change 77-78	1978	% Change 78-79	1979	% Change 79-80	1980	Distance From Padre Island	Beach Condition
1. Padre Island National Seashore								0	Beach Oiled
Jan	23,379	+20.9	28,267						
Feb	30,205	+18.0	35,657						
Mar	91,285	-18.1	74,754						
Apr	65,403	+25.7	82,199						
May	109,340	-9.7	98,775						
Jun	119,296	-8.9	108,661				100,752		
Jul	131,244	-13.7	113,203(a)				69,225		
Aug	118,694	-25.5	88,399(b)						
Sept	51,457	-23.8	39,210						
2. Port Aransas								10 Miles	Beach Oiled
Jan									
Feb									
Mar									
Apr									
May									
Jun									
Jul									
Aug									
Sept									
3. South Padre Island			557,900	+31.8	735,500			0	Beach Oiled
4. Corpus Christi		+17.3	1,661,900	-1.0	1,645,800			15 Miles	Inland
5. Brownsville			1,252,900	+22.0	1,529,400			30 Miles	Inland
6. Goose Island State Park	302,236	+6.3	321,285	-4.1	308,050			30 Miles	Behind Barrier Island No Oil
7. Galveston Island State Park	576,246	-21.1	447,112	+1.2	452,616			170 Miles	No Oil
8. Galveston			2,052,300	-10.3	1,841,200			190 Miles	No Oil
9. Sea Rim State Park (Completed FY 79)	169,354	+25.7	212,807	+53.2	326,036			240 Miles	No Oil

Source: Padre Island National Seashore; Texas State Dept. of Highways & Public Transportation; Texas State Parks; Mr. Barr, Port Aransas Personal Communication. (1980)

(a) Gasoline Shortage July 1979
(b) Oil Reached Texas Beaches August 1979

the force and volume of the Ixtoc blowout. (The Ixtoc I spill lasted 296 days and spilled an estimated 3.1 million barrels of oil.)

The Santa Barbara oil spill in 1969 was and still is the worst blowout in U.S. waters, and lasted for 10 days with approximately 5,600 barrels spilled (1973 annual meeting, AAPG). Since that time technology has improved, far stricter safety requirements are in effect. Thus, any spill that might occur in Sale 53 area is estimated to last no more than 4 or 5 days or leak more than 1,000 barrels/day, as the estimated reserves are far smaller than the Bay of Campeche. The Amoco Cadiz was 1-1/2 km from shore when it ran aground and it is estimated to have lost 90% of its 1.6 million barrels cargo within the first eleven days of the spill. This amounted to an average of 131,975 barrels per day for the first eleven days and then an average of 18,000 barrels for the remaining 9 days. Of this oil, it is estimated that 586,400 barrels actually impacted the shoreline, with approximately 470,000 barrels coming ashore within the first 2-1/2 weeks of the spill, and impacted 72 km of shoreline. This was the result of a super tanker grounding virtually on the beach, and in an area of extremely strong currents and high tidal ranges, which are not found in the Sale 53 area. However, by studying these incidents, it is possible to get a worst-case impact for the area. Central and northern California has many recreational and tourist areas which are sensitive to potential impact from oil spills. These areas have been divided into 17 sections in order to facilitate the analysis and to help locate individual areas. This listing is found in Table IV.B.5-3.

These sections have been set up arbitrarily, on basically a county system, and this does not mean that if there is an oil spill it will only impact one section. To determine the probabilities of any of these areas being impacted, one should consult the oil spill model after the shoreline segment has been determined. The impact to the local economies can be approximated by estimating the number of tourists who would stay away from the area. This percentage would be greater for the small communities than for large cities. In San Francisco a majority of tourists spend their time sightseeing and attending cultural affairs, as opposed to the small communities and the rest of the Coast where tourists tend to spend their time relaxing at the beach, fishing, or enjoying the local coastal environment. Thus, the small community whose economic base is heavily dependent on tourism could be more severely impacted than the larger towns/cities. The closing of the beaches would increase the reluctance of tourists to go to the area, and they would tend to stay away from the impacted area even after it was cleaned, due to the publicity that is associated with spills.

The large city, however, would probably only have a slight reduction in tourism, as there are numerous other activities which people would substitute. Businesses along the beach would be most seriously impacted economically, but would tend to be more able to survive than their small

TABLE IV.B.5-3

SENSITIVE RECREATIONAL AREAS

DEL NORTE COAST	Smith River Marinas, Pelican S.B.*, Crescent City Harbor, Del Norte Coast Redwoods S.P.**, Redwood National Park, Klamath River Marinas, Prairie Creek Redwoods S.P.
N. HUMBOLDT COAST	Redwood National Park, Prairie Creek Redwoods S.P., Dry Lagoon S.P., Big Lagoon, Agate Beach, Patricks Point S.P., Trinidad S.B., Trinidad Harbor, Little River S.B., Redding Rock.
EUREKA AREA	Mad River, North Spit, Mad River Slough, Humboldt Bay (Arcata Bay and South Bay), South Spit, Eel River, Centerville Beach.
S. HUMBOLDT COAST	Bear River, Cape Mendocino, Mattole River, Kims Range National Conservation Area, Point Delgada, Shelter Cove.
N. MENDOCINO COAST	Simkome Wilderness S.P., Whale Gulch, Bear Harbor, DeViblis Ranch, Cottoneva Creek, Rockport Bay, Westport Union Landing S.B., Seaside Creek, Ten Mile River, Ten Mile Domes and Inglenook Fen. Vsal Ranch.
FORT BRAGG - MENDOCINO AREA	Laguna Point, MacKerrichner S.P., Fort Bragg, Noyo River, Jug Handle State Reserve, Caspar Headlands State Reserve, Point Cabrillo, Russian Gulch S.P., Mendocino Headlands S.P., Big River, Van Damme S.P., Albion Cove.
S. MENDOCINO COAST	Navarro River, Cuffeys Cove, Laguna Ranch, Manchester S.B., Garcia River, Point Arena, Arena Cove, Haven Anchorage, Gualala River.
SONOMA COAST	Sea Ranch, Stewarts Point, Richardson, Kruse Ranches, Salt Point S.P., Ocean Cove, Stillwater Cove, Timber Cove, Fort Ross State Historic Park, Russian Gulch, Jenner Beach, Russian River, Goat Rock, Sonoma Coast S.B., Bodega Bay.
MARIN COAST	Dillon Beach, Tons Point, Tomales Bay, Inverness Park, Tomales Bay S.P., Point Reyes National Seashore, Bolinas Lagoon, Seadrift Beach, Stimson Beach, Steer Ravine, Muir Beach, Golden Gate National Recreation Area, Mount Tanalpais S.P.
SAN FRANCISCO	Golden Gate National Recreation Area, Farallon Islands.

TABLE IV.B.5-3 (Sheet 2 of 2)

SAN MATEO COAST	Thornton S.B., Daly City, Pacifica, San Pedro Beach, Great Whale Cove S.B., Montara S.B., Fitzgerald Marine Reserve, Pillar Point Harbor, Half Moon Bay S.B., Martins Beach, San Gregorio S.B., Pomponio S.B. Pescadero S.B., Beach Hollow S.B., Bolsa Point Beach, and Nuevo State Reserve.
SANTA CRUZ COAST	Scott Beach, Davenport Landing, Wilder Ramen S.P., Natural Bridge S.B., Santa Cruz Harbor, San Lorenzo River, Twin Lakes S.B., New Brighton S.B., Seacliff S.B., Manresa S.B., Sunset S.B.
N. MONTEREY COAST	Zmudowski S.B., Moss Landing S.B., Moss Landing Harbor, Elkhorn Slough, Salinas River S.B., Salinas Lagoon National Wildlife Refuge, Salinas River Dunes, Marina Dunes.
MONTEREY PENINSULA	South Monterey Bay Beaches, Monterey S.B., Monterey Harbor, Cannery Row, Asilomar S.B., 17 Mile Drive, Del Monte Forest, Pebble Beach, Carmel City Beach, Carmel River S.B., Carmel Bay, Carmel Area Kelp Beds, Point Lobos State Reserve, Yankee point, Malpaso Beach, Sobrantes Point, California Sea Otter Refuge, Garrapata Beach.
BIG SUR COAST	California Sea Otter Refuge, Motley's Landing, Bixby Landing, Little Sur River, Point Sur, Big Sur River, Andrew Molera S.P., Pfeiffer Beach, Sycamore Canyon, Julia Pfeiffer Burns S.P., John Little State Reserve, Los Padres National Forest.
SAN LUIS OBISPO COAST	California Sea Otter Reserve, Point Piedras Blancas, William Randolph Hearst Memorial S.B., San Simeon S.B., San Simeon Bay, Cambria, Cayucos S.B., Atascadero S.B., Morro Strand S.B., Morro Bay S.P., Morro Bay, Montana De Oro S.P., Point Buenon, Port San Luis Avila S.B., Mallagh Landing, Dinosaur Caves, Pismo S.B., Pismo Dunes State Vehicular Recreation Area, Santa Maria Dunes.
SANTA BARBARA COAST	Guadalupe Dunes, Point SA S.B. Vandenberg Dunes, Santa Ynez River Estuary, Surf, Jalama, Channel Islands National Park.

* State Beach

** State Park

community counterpart, due to the number of people in the city who would go down to the beach to see the oil. This tendency of people to go to see a disaster has been shown at Mount St. Helens where people go to the area just to look, oblivious to the existing danger of another volcanic eruption.

Several recreational areas are used more heavily than others, and these tend to be within reach of the major metropolitan centers. Pt. Reyes National Seashore and Golden Gate National Recreation Area have a combined annual attendance of over 14.9 million people, most of whom tend to be day visitors from the San Francisco area. If an oil spill reached one of these areas, impacts could be severe, as they are both sensitive ecological habitats as well as tourist and recreational areas. The local communities would be hit hard economically, but the tourist would still be present in San Francisco, where the economic impact would be less noticeable if indeed it was noticed.

The San Mateo and Santa Cruz beaches are also within reach of the San Francisco Metropolitan Area, and a closure of the beaches for one month could reduce beach attendance by over 1.5 million people (see Table IV.B.5-4). This would put a severe stress on the beach communities.

A similar closure of the San Luis Obispo beaches could cause a reduction of over 3 million people, but in this case, the majority of the people are overnight visitors and this reduction would have severe economic results on the local communities such as Morro Bay, Grover City and Cambria.

The greatest impacts on sportfishing will be from oil spills. Should a spill occur or move into a sportfishing area, fishing would be temporarily discontinued until cleanup has been completed due to the possibility of gear and vessels being contaminated and fish tainted. Additionally, boats may be confined to port by oil containment booms. A major spill could have temporary economic impacts upon operators of passenger carrying fishing vessels who rely upon sportfishing activities for their living, and on local tourist industries that rely on their marine resources to attract visitors. The California Department of Fish and Game has identified tracts in the Point Arena Basin that are near important abalone harvesting areas (see the Sensitive Biological Areas Alternative). A major spill could also affect sportfishing by impacting fish and invertebrate populations (see discussion under commercial fisheries). Declines in salmon and other anadromous fish populations probably will have the most significant impacts. Mitigation is provided by OCS Order No. which requires that each oil company develop oil spill contingency plans and have ready access to pollution-control equipment. For large spills, these measures will probably have minimal effectiveness since rough seas frequently occur in the proposed lease area. Formulation of new oil spill cooperatives in the future may further

TABLE IV.B.5-4

PROJECTED BEACH ATTENDANCE (IN 1000's) BY MONTH

San Mateo and Santa Cruz Counties State Beaches

F/Y	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
84/85	1,349	1,160	805	450	331	300	331	457	450	450	544	868
89/90	1,424	1,223	849	475	350	316	350	483	475	475	575	916
94/95	1,499	1,287	893	500	368	333	368	509	500	500	605	964
99/2000	1,574	1,351	938	525	387	350	387	535	525	525	636	1,012

San Luis Obispo State Beaches

F/Y	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
84/85	2,135	2,135	1,068	320	320	320	320	427	427	534	854	1,815
89/90	2,542	2,542	1,271	381	381	381	381	508	508	635	1,017	2,161
94/95	2,948	2,948	1,474	442	442	442	442	590	590	737	1,179	2,506
99/2000	3,355	3,355	1,677	503	503	503	503	671	671	839	1,342	2,851

Source: Projections calculated by least square adjustments of State of California Park and Recreation Statistical Reports.

mitigate these impacts. The other OCS orders are intended to reduce the likelihood of oil spills, however, these measures will not reduce the estimated losses noted above since these losses are based on the predicted number of oil spills over the life of the project. The Offshore Oil Pollution Compensation Fund was created to compensate for these and other losses (see Section I.B.7.b). Since this Fund is new, its effectiveness cannot be evaluated.

There is no doubt that production platforms act as artificial reefs. However, this may not benefit the sport fishermen since oil companies generally discourage sport fishermen from anchoring or otherwise floating next to a platform. The total fishing area that will be precluded by OCS structures will be negligible. Other types of conflicts between sportfishing and manmade structures are not anticipated, but if they occur, the Fishermen's Contingency Fund will compensate for most of the losses (see Section I.B.7.c.). On the positive side, the proposed lease sale will provide navigational aids and locations where emergency help can be obtained in case a vessel is disabled or a passenger injured.

Discharges, effluents and vessel traffic essentially will impact sportfishing as they impact commercial fisheries (see Section IV.B.4).

Summary. The chances of impacts of the magnitude described above are very remote as these are worst-case situations. Containment will be initiated at the point of the spill, thus, reducing the amount of free oil comprising the spill. The spill will partially weather before contacting the shore, and with the proper use of mitigating measures, the anticipated impact will be far less severe than worst-case. In the presence of tar balls, the beach could still be used during cleanup operations as has been seen along sections of Cape Hatteras National Seashore, when tar balls impacted the beach after vessels had cleaned their tanks offshore.

The time involved for cleanup operations depends entirely on the size of spill, the extent of shoreline impacted, the effectiveness of the absorbers and cleanup equipment, the type of shoreline impacted, the accessibility of the impacted area, the speed of the response team, and the weather. The greatest probability is for the spills to occur during the lower use periods, and in periods of poorer weather conditions. This will, in turn, tend to reduce the economic impact on recreational activities for the local areas, however, it will make cleanup operations more difficult and time consuming and, therefore, will increase the cost of the cleanup operation. Tourism, however, will remain normal for the total sale area with localized reductions. The exact economic impact cannot be stated as it is entirely dependent on conditions present at the time of the spill and not on conditions at present, and has to include all costs of cleanup, loss to the local economy and compensation to the local businesses.

The aesthetic impact will be serious in the case of a spill contacting the shoreline for the period of contamination. However, the impact of offshore structures will be relatively minor as the distance offshore, that the structures are situated, will affect the size of the object seen (see Figure IV.B.11-1).

Conclusion: The impact of the proposal on the recreation of the area will be minor unless an oil spill contacts the shoreline. The visual and aesthetic impacts will also be minor other than the case where a spill has contacted the beach. Decline in recreational use would lead to a loss of tourist revenue. The impact could be localized and short-term with only mild economic consequences but could become regional in scope and more economically damaging depending on the beaching location, size, duration, nature and season of the spill, and publicity associated with a major pollution incident.

Oil spills will impact sportfishing if they occur or move into a sportfishing area since fishing would be temporarily discontinued. A major spill could have temporary economic impacts upon operators of passenger carrying fishing vessels who rely upon sportfishing activities for their living, and on local tourist industries that rely on their marine resources to attract visitors. The California Department of Fish and Game has identified tracts in the Point Arena Basin that are near important abalone harvesting areas (see the Sensitive Biological Areas alternative). A major spill could also affect sportfishing by impacting fish and invertebrate populations (see discussion under commercial fisheries). Declines in salmon populations and other anadromous fish probably will have the most significant impacts. The total fishing area that will be precluded by OCS structures will be negligible. Other types of conflicts between sportfishing and manmade structures are not anticipated. On the positive side, the proposed lease sale will provide navigational aids and locations where emergency help can be obtained in case a vessel is disabled or a passenger injured.

Discharges, effluents and vessel traffic essentially will impact sportfishing as they impact commercial fisheries (see Section IV.B.4).

Cumulative Impacts (General Recreation). The cumulative impacts from proposed Sale 53 and previous offshore oil and gas leases in California are expected to be minor in central and northern California. This is because the primary impact agent, spilled oil, would usually be carried south by winds and currents. The highest probability of an oil spill, from existing OCS activities, moving into the proposed Sale No. 53 area is 3 percent within 30 days. Surfing, swimming, picknicking and other beach use activities could be affected, to a limited degree. Tourism would be affected by an amount dependent on the volume of oil, the time of year, the area impacted, and the extent of news coverage.

There are, however, significant cumulative impacts from the proposal outside the Sale No. 53 area. The same oceanographic and meteorological conditions which would normally move an oil spill from existing leases away from central and northern California would also move spilled oil from central and northern California into the southern California area. The probabilities of a spill reaching San Miguel Island, Wilson or Richardson Rocks increases over 11% which would impact sport diving and to a lesser extent, general boating and sportfishing. Increased probabilities of oil hitting other southern California recreational areas could affect swimmers, surfers and other general beach users as well as boaters. The extent of the cumulative impacts are expected to be negligible based upon increased spill probabilities of less than 5 percent.

Cumulative Impacts (Sportfishing). The cumulative impacts of the proposed lease sale and other activities will place additional stresses on sportfishing. The proposed lease sale will add to the probability of the occurrence of a major oil spill and will increase chronic, low-level discharges of pollutants which may significantly impact the populations and sportfishing. The salmon fishery is particularly subject to cumulative impacts because salmon populations also are stressed from habitat degradation of their freshwater spawning streams. On the positive side, the proposed lease sale will provide additional navigational aids and locations where emergency help can be obtained in case a vessel is disabled or a passenger injured.

6. Impacts on Socio-Economic Systems: As discussed in Section IV.A.6, the impact analysis in this section is based on computer outputs from the Curtis Harris Economic Model. The outputs were derived from inputs relating to investment, employment, and value of production by geographic area and year. The tables in this section detail various demographic and economic levels expected to result, giving an indication of socio-economic impacts from proposed Sale No. 53.

Quantification given in all the following tables represents aggregate county-level changes. A likely situation would be that the more major impacts occur in the county's immediate coastal area. Thus, quantification based on county impacts may mask important impacts occurring to communities in the coastal zone. However, quantification below the county level is generally inappropriate at this stage--resource levels are probabalistic and specific hydrocarbon structures are undefined. Detailed quantification below the county level becomes more meaningful after exploration establishes the resource base. Site-specific information is also developed at that time regarding transportation and the offshore and onshore requirements for each particular area and subarea. Site-specific information is included in EIS's and Exploration and Development Plans written for particular lease units. (See Section I.B.7.g.)

Output from the Harris economic model can be used as input for more disaggregated models. This allows further analysis of potential impacts based on preliminary data and information. Pacific OCS Reference Paper 53-3 includes a disaggregated analysis of local impacts in the nine-county San Francisco Bay Area region.

Impact on Population. All quantities in the following tables represent the amount of change from the projected based period (see Section III.D.2.b). Population changes result due to net migration (in minus out migration) and natural increases in population, that is, births minus deaths. Increased population in a region can affect the urban/rural balance of an area and its economic base. Increased population would likely result in proportionately more in urban centers and result in additional economic activity to support the population increase. The changes in population resulting from the proposed Sale for each of the coastal counties noted in Table IV.B.6-1 represent the increase (or decrease) over the projected base for years 1985, 1990, and 1995. These changes largely result from the availability, or lack thereof, of jobs in an area. Total population impact for the 16 county coastal area is expected to be 13,060 persons in the peak year (1990) which represents about 0.2 percent of the total estimated coastal population base of 7,252,092 for that year. The impact of proposed Sale No. 53 on total California State population is projected at 21,878 in 1990 which represents about 0.08 percent of the total estimated population base of 26,132,263 projected for that year.

TABLE IV.B.6-1

YEARLY POPULATION CHANGES DUE TO PROPOSED
SALE NO. 53 RELATED ACTIVITY^a

(Most Probable Resource Estimates)

County	1985 Change	%	1990 Change	%	1995 Change	%
Alameda	13	z	-217	-z	-112	-z
Contra Costa	28	z	1313	z	1899	z
Del Norte	-1	-z	-3	-z	-1	-z
Humboldt	526	z	1214	1.2	1962	1.9
Marin	141	z	310	z	333	z
Mendocino	747	1.0	1729	2.1	1752	1.9
Monterey	-25	-z	-101	-z	-45	-z
Napa	-1	-z	-24	-z	-14	-z
San Francisco	30	z	58	z	20	z
San Luis Obispo	1009	z	1839	1.0	1317	z
San Mateo	1784	z	2140	z	1566	z
Santa Barbara	1987	z	4313	1.3	3587	z
Santa Clara	-11	-z	-155	-z	-164	-z
Santa Cruz	-3	-z	-37	-z	-28	-z
Solano	-7	-z	106	z	219	z
Sonoma	142	z	574	z	354	z
16 Coastal County Total ^b	6,358	z	13,060	z	12,645	z
California Totals	6,025	z	21,878	z	18,821	z

^aNotation "z" represents a change less than 1 percent from base

^bFigures may not total due to rounding

TABLE IV.B.6-2

YEARLY CHANGES IN NUMBER OF JOBS DUE TO
PROPOSED SALE NO. 53 - DIRECT AND INDUCED^a

(Most Probable Resource Estimates)

County	1985 Change	%	1990 Change	%	1995 Change	%
Alameda	4	z	-107	-z	-54	-z
Contra Costa	12	z	635	z	957	z
Del Norte	0	0	-2	-z	-1	-z
Humboldt	228	z	520	1.2	823	1.9
Marin	73	z	158	z	178	z
Mendocino	290	z	599	1.8	538	1.5
Monterey	-10	-z	-39	-z	-17	-z
Napa	-1	-z	-11	-z	-6	-z
San Francisco	26	z	50	z	18	z
San Luis Obispo	451	z	855	1.1	631	z
San Mateo	1,005	z	1,181	z	856	z
Santa Barbara	854	z	1,899	1.3	1,609	z
Santa Clara	-6	-z	-85	-z	-86	-z
Santa Cruz	-1	-z	-17	-z	-12	-z
Solano	-3	-z	44	z	91	z
Sonoma	66	z	273	z	175	z
16 Coastal County Total ^b	2,988	z	5,953	z	5,699	z
California Totals	2,815	z	10,121	z	8,723	z

^aNotation "z" represents a change less than 1 percent from base

^bFigures may not total due to rounding

Conclusion. Total population impacts are projected at 13,060 in the peak production year of 1990 as a result of the proposed sale, which includes both direct population changes and all induced population impacts. This projected change is distributed over 16 counties in the central and northern California coastal area. This population increase represents a 0.08 percent increase over the projected base. The resulting impacts are thus very minor as a result of the proposed Sale. Particular communities or towns where onshore facilities could be expected to be located would have more moderate increases. Areas adjacent to the offshore basins, but still distant from the temporary or permanent onshore support bases, would likely have very minor population impacts.

Cumulative Impacts (Population). Cumulative impacts as a result of the proposed Sale and other projects (e.g., previous OCS sales, LNG facility, etc., discussed in Section III.B.3.b) would have additional effects on the urban/rural characters of areas and a region's economic base. Cumulative impacts would tend to concentrate relatively more people in coastal regions and increase economic activity to a minor extent. Total population increase is expected at about 16,300 in the peak production year of 1990. This represents about a 0.1 percent increase over the projected base.

Impact on Employment. Employment changes resulting from the proposed Sale are presented in Table IV.B.6-2 for the 16-county coastal area. On the whole, the central and northern California coastal economy will be affected to a minor degree by Sale No. 53 and related activity. The only counties where employment increases are greater than 1 percent (peak production year, 1990) are the counties of Humboldt, Mendocino, San Luis Obispo, and Santa Barbara. Even in these counties, however, peak period direct and induced employment impacts represent less than a 2 percent increase over the projected employment base. The employment impacts are quite small in all other coastal counties, and, in fact, a slight decrease from the projected base is forecast for six counties in the region for the peak year, 1990. These decreases would result if workers tended to move out of these counties to areas where employment opportunities were viewed as more favorable.

Currently, California has an estimated total civilian employment of 10.24 million, and an estimated 2.50 million in the mining, construction, and manufacturing sectors. (California Department of Finance, 1979). Thus, while the direct and induced employment changes are rather high in an absolute sense for the 16-county coastal area and California as a whole, they are relatively minor when compared to total State employment. The majority of the 5,953 increase in coastal county jobs in the peak year is expected in those two sectors most directly affected by OCS development, petroleum mining (610 jobs) and construction (623). Other sectors which have significant increases in numbers of jobs are wholesale trade (320), finance-insurance-real estate

(660), and retail stores (972).

The preceding tables were based on the most probable resource estimates for Sale No. 53. Table IV.B.6-3 gives projections of the possible range of population and employment impacts. These were derived based on inputs to the Harris Model for the low and high resource estimates (Section I.B.2.b). The table indicates that even the rather significant variation between low and high resource estimates results in relatively minor socio-economic impacts in the region. Generally, the same counties are affected in a rather similar manner.

Conclusion. Employment impacts resulting from the proposed sale are similar to population impacts because the two tend to vary together. The peak amount of direct and induced employment is 5,953 in 1990. Changes in employment may affect the economic and social character of an area. OCS employment would also likely result in induced employment in some service sectors of the economy. Total employment impacts (direct and induced) represent, however, less than a 1 percent increase in the 16 coastal counties. Low and high resource estimates do not cause employment impacts greater than 1 percent in the region. Particular communities where the onshore activities are concentrated would be affected to a more moderate extent.

Cumulative Impacts (Employment). Total employment impacts (which also consider those other projects noted in Section III.B.3.b - previous OCS sales, LNG facility, etc.) could result in total employment impacts of about 8,400 in 1990. This would result in a general expansion of the economic base in those areas where employment was centered. There would, however, be little change in the economic and employment character of the region as a whole because cumulative employment impacts are very minor - less than a 1 percent increase over the projected base case condition.

Impact on Infrastructure. The final three tables (Tables IV.B.6-4, -5, and -6) detail changes that would result to four important economic variables, personal income, private investment, value added, and State and local government purchases in each of the counties for the peak year (1990). These variables are important determinants of the economic and social infrastructure in a region. Infrastructure impacts are those changes in the economic and social character of a region. As a result of these changes, the relative balance between the private and government (or social) sectors may change. Each table is based on a different transportation scenario. Table IV.B.6-4 is based on the most probable transportation scenario, mixed modes of pipelines and tankers. The final two tables use the alternative transportation/development scenarios. Table IV.B.6-5 is based on the transportation scenario of 100 percent tankering to California refineries, while Table IV.B.6-6 is based on the transportation scenario of 100 percent tankering of crude to the Gulf coast.

POPULATION AND EMPLOYMENT
CHANGES IN PEAK YEAR (1990)^a

(Range Based on Low and High Resource Estimates)

County	Population Change (Low to High)	%	Employment Change (Low to High)	%
Alameda	-193 to -327	*	-87 to -163	*
Contra Costa	343 to 2,523	*	162 to 1229	*
Del Norte	-2 to -5	*	-1 to -2	*
Humboldt	710 to 1,666	z - 1.6	304 to 714	z - 1.6
Marin	297 to 448	*	159 to 226	*
Mendocino	1,276 to 1,961	1.5 - 2.4	434 to 684	1.3 - 2.1
Monterey	-74 to -138	*	-28 to -53	*
Napa	-16 to -35	*	-7 to -16	*
San Francisco	-11 to 93	*	-11 to 82	*
San Luis Obispo	1,210 to 2,599	z -1.4	563 to 1,207	z - 1.6
San Mateo	1,036 to 3,650	*	574 to 2,016	*
Santa Barbara	2,603 to 6,176	z -1.8	1,147 to 2,719	z - 1.8
Santa Clara	-166 to -292	*	-86 to -156	*
Santa Cruz	-31 to -58	*	-13 to -26	*
Solano	0 to 247	*	0 to 104	*
Sonoma	430 to 822	*	207 to 390	*
16 Coastal County Total ^b	7,410 to 19,330	*	3,317 to 8,953	*
California Totals	10,141 to 15,248	*	4,603 to 32,556	*

*Range within 1 percent of base period projection

^aNotation "z" represents a change less than 1 percent from base

^bFigures may not total due to rounding

TABLE IV.B.6-4

CHANGES IN VARIOUS ECONOMIC COMPONENTS DUE TO
SALE NO. 53 ACTIVITY^a
Transportation Scenario No. 1

(Peak Year, 1990 - Most Probable Resource Estimates)
(\$ Thousands)

County	Personal Income	%	Private Investment	%	Value Added	%	State & Local Gov't Purchases ^b	%
Alameda	-1,511	-z	-291	-z	-2,604	-z	-408	-z
Contra Costa	10,649	z	1,577	z	51,993	z	976	z
Del Norte	-30	-z	-4	-z	-28	-z	-8	-z
Humboldt	8,455	1.1	1,472	1.5	11,809	1.5	1,096	z
Marin	2,801	z	294	z	2,635	z	392	z
Mendocino	10,047	2.1	1,260	1.6	11,088	1.8	1,659	1.2
Monterey	-626	-z	-93	-z	-738	-z	-149	-z
Napa	-154	-z	-26	-z	-231	-z	-34	-z
San Francisco	452	z	-40	-z	196	-z	-88	-z
San Luis Obispo	14,415	1.1	188,956	107.4	17,187	1.5	1,973	z
San Mateo	18,941	z	13,805	1.5	28,341	z	2,753	z
Santa Barbara	31,558	1.3	351,832	85.2	48,846	2.1	4,189	1.1
Santa Clara	-1,166	-z	-319	-z	-2,122	-z	-316	-z
Santa Cruz	-219	-z	-46	-z	-391	-z	-51	-z
Solano	679	z	122	z	5,686	z	22	z
Sonoma	4,635	z	426	z	4,818	z	599	z
16 Coastal County Total ^c	98,926	z	558,924	5.7	176,487	z	12,606	z
California Total	166,402	z	565,085	1.8	375,138	z	17,569	z

^aNotation "z" represents a change less than 1 percent from base

^bGovernment expenditures for current items and employee compensation

^cFigures may not total due to rounding

TABLE IV.B.6-5

CHANGES IN VARIOUS ECONOMIC COMPONENTS DUE TO
SALE NO. 53 ACTIVITY^a
Transportation Scenario No. 2

(Peak Year, 1990 - Most Probable Resource Estimates)
(\$ Thousands)

County	Personal Income	%	Private Investment	%	Value Added	%	State & Local Gov't Purchases ^b	%
Alameda	-1,483	-z	-283	-z	-2,549	-z	-401	-z
Contra Costa	10,782	z	1,603	z	52,808	z	989	z
Del Norte	-30	-z	-4	-z	-27	-z	-8	-z
Humboldt	6,517	z	832	z	7,337	z	916	z
Marin	2,799	z	295	z	2,643	z	392	z
Mendocino	9,383	2.0	1,134	1.4	9,692	1.5	1,539	1.1
	-597	-z	-89	-z	-702	-z	-145	-z
Napa	-152	-z	-26	-z	-226	-z	-33	-z
San Francisco	446	z	-36	-z	202	z	-88	-z
San Luis Obispo	13,457	1.1	188,803	107.3	16,062	1.4	1,768	z
San Mateo	16,606	z	13,372	1.5	23,143	z	2,350	z
Santa Barbara	26,824	1.1	351,072	85.0	35,517	1.5	3,471	z
Santa Clara	-1,090	-z	-304	-z	-2,000	-z	-303	-z
Santa Cruz	-213	-z	-45	-z	-380	-z	-26	-z
Solano	699	z	126	z	5,790	z	25	z
Sonoma	4,641	z	428	z	4,833	z	601	z
16 Coastal County Total ^c	88,590	z	556,883	5.7	152,144	z	11,022	z
California Total	157,128	z	563,259	1.8	354,416	z	16,147	z

^aNotation "z" represents a change less than 1 percent from base

^bGovernment expenditures for current items and employee compensation

^cFigures may not total due to rounding

TABLE IV.B.6-6

CHANGES IN VARIOUS ECONOMIC COMPONENTS DUE TO
SALE NO. 53 ACTIVITY^a
Transportation Scenario No. 3

(Peak Year, 1990 - Most Probable Resource Estimates)
(\$ Thousands)

County	Personal Income	%	Private Investment	%	Value Added	%	State & Local Gov't Purchases ^b	%
Alameda	-1,652	-z	-301	-z	-2,708	-z	-425	-z
Contra Costa	929	z	-32	-z	412	z	29	z
Del Norte	-31	-z	-4	-z	-29	-z	-9	-z
Humboldt	8,451	1.1	1,471	1.5	11,805	1.5	1,095	z
Marin	2,722	z	290	z	2,605	z	385	z
Mendocino	10,045	2.1	1,260	1.6	11,084	1.8	1,659	1.2
Monterey	-627	-z	-93	-z	-737	-z	-150	-z
Napa	-158	-z	-27	-z	-238	-z	-34	-z
San Francisco	176	z	-97	-z	-443	-z	-124	-z
San Luis Obispo	13,919	1.1	188,877	107.3	16,613	1.5	1,871	z
San Mateo	17,487	z	13,597	1.5	26,508	z	2,471	z
Santa Barbara	30,145	1.3	351,608	85.2	46,977	2.0	3,925	1.0
Santa Clara	-1,254	-z	-331	-z	2,264	z	-326	-z
Santa Cruz	-239	-z	-48	-z	-414	-z	-53	-z
Solano	-358	-z	-61	-z	-444	-z	-80	-z
Sonoma	4,582	z	422	z	4,783	z	594	z
16 Coastal County Total ^c	84,136	z	556,532	5.7	113,511	z	10,830	z
California Total	122,244	z	557,718	1.7	151,572	z	12,910	z

^aNotation "z" represents a change less than 1 percent from base

^bGovernment expenditures for current items and employee compensation

^cFigures may not total due to rounding

TABLE IV.B.6-7

CHANGES IN VARIOUS ECONOMIC COMPONENTS DUE TO
SALE NO. 53 AND OTHER ACTIVITY - CUMULATIVE IMPACTS^a

(Peak Year, 1990 - Most Probable Resource Estimates)

(\$ Thousands)

County	Personal Income	%	Private Investment	%	Value Added	%	State & Local Gov't Purchases ^b	%
Alameda	-2,708	-z	-519	-z	-4,789	-z	-683	-z
Contra Costa	19,028	z	2,842	z	77,943	1.3	2,151	z
Del Norte	-42	-z	-7	-z	-44	-z	-12	-z
Humboldt	8,276	1.1	1,443	1.4	11,550	1.5	1,063	z
Marin	2,714	z	255	z	2,224	z	363	z
Mendocino	9,953	2.1	1,240	1.5	10,927	1.7	1,643	1.2
Monterey	-1,031	-z	-161	-z	1,363	-z	-233	-z
Napa	-316	-z	-59	-z	-501	-z	-67	-z
San Francisco	394	z	-132	-z	-631	-z	-151	-z
San Luis Obispo	47,875	3.8	193,064	109.7	175,180	15.7	6,813	1.8
San Mateo	17,943	z	13,614	1.5	26,468	z	2,572	z
Santa Barbara	205,685	8.5	376,887	91.3	388,928	16.5	28,902	7.4
Santa Clara	-3,502	-z	-682	-z	-5,841	-z	-667	-z
Santa Cruz	-429	-z	-83	-z	-771	-z	-87	-z
Solano	1,922	z	294	z	10,272	z	200	z
Sonoma	4,600	z	406	z	4,572	z	595	z
16 Coastal County Total ^c	310,364	z	588,402	6.0	694,123	1.0	42,404	z
California Total	453,280	z	605,691	1.9	1,186,480	z	57,064	z

^aNotation "z" represents a change less than 1 percent from base.

^bGovernment expenditures for current items and employee compensation.

^cFigures may not total due to rounding.

These tables tend to indicate that there would likely be very little in the way of infrastructure stresses as a result of the proposed sale. The very minor increases in personal income imply little possibility for significant changes in its distribution which is one of the major components of infrastructure stress. Similarly, changes in value added imply little in the way of changes to the existing economic base in all counties and under all transportation scenarios. Increased private investment is also minor in all counties in the peak year, except for San Luis Obispo and Santa Barbara counties. Private investment does increase significantly in 1990 in both areas because of increased offshore and onshore capacity. However, investment drops off radically in succeeding periods. State and local government purchases are also impacted to only a minor degree in all counties under the three scenarios. It should be remembered, however, that quantities given in these tables represent aggregate county changes. Therefore, particular areas or localities could be impacted to a greater or lesser extent than is indicated by the county total. Greatest impacts will occur in areas with onshore support bases. Note should also be made that socio-economic impacts in the central and northern California coastal areas are slightly greater under transportation Scenarios Nos. 1 and 2 than under transportation Scenario No. 3.

Table IV.B.6-7 details cumulative impact information. It is based on activity that would result from proposed Sale No. 53 and from other projects in the California coastal region. The other projects are those which were discussed in Section III.B.3.b. As the table indicates, cumulative impacts vary little from what would be the case with just Sale No. 53 activity. For most counties the cumulative impacts represent less than a 1 percent change from the projected base. As before, Humboldt, Mendocino, San Luis Obispo, and Santa Barbara counties are affected to a slightly greater extent.

Conclusion. Increased population or employment activity may require additional government services. Socio-economic impacts are quite minor in the central and northern California coastal area, though particular communities where temporary and permanent support bases are located will be affected to a greater extent. This is the case under the most probable resource estimates, as well as the high and low resource estimates. While development of OCS areas may cause certain localized infrastructure impacts, the overall change is generally quite minor relative to the existing social and economic base in the region.

Cumulative Impacts (Infrastructure). Infrastructure impacts are increased when other activity is included. Additional projects in coastal areas will necessitate planning activity by local government to meet needs that could arise with increased population and changes in the economic structure. However, the extent of change is generally quite minor in the region. Slightly greater infrastructure impacts would result in the counties of Humboldt, Mendocino, San Luis Obispo and Santa

Barbara.

The economic impacts from OCS development can also be discussed generically, noting the various requirements at different development stages. Typically, OCS petroleum development requires a rather established and structured developmental process which has particular implications to socio-economic impacts at each development stage. The following discussion focuses on socio-economic impacts in terms of typical OCS oil and gas stages and activities.

OCS development is generally regarded as involving the following phases: exploration, construction, development, and production. Exploration refers to the drilling of exploratory wells. This activity is conducted from exploratory drill rigs of varying sizes and configurations. These large and virtually self-contained structures are equipped with virtually everything that is required for the exploratory drilling process. Mobile rigs operate in a global market, moving into areas where work and contracts are available.

Exploration activities generally result in relatively minor socio-economic impacts. Drill crews generally consist of personnel from the existing work force at the vessel's home port. The self-contained nature of a drillship requires little onshore support: a typical exploratory rig crew of from 75 to 100 would require an additional 25 to 50 onshore service and support workers. The locations of likely temporary support bases are discussed in Section IV.A.2.a. Because personnel live onboard the vessel or reside near the temporary port of operations, the relatively short duration of exploration activities generally results in little or no population growth, demand for permanent housing, or expansion of community services during this phase in the nearby onshore area.

After exploration has resulted in a commercial discovery, a fixed platform must be designed, ordered, fabricated, and installed. Platform fabrication would be accomplished at shipyards where the needed facilities exist. Possible locations include the West Coast (east San Francisco Bay Area and Puget Sound, Washington), the Gulf coast (with several locations), and, increasingly, from overseas, primarily Japan. Given these locations, it is doubtful that any significant socio-economic impacts to central and northern California coastal communities would result.

Other construction activities include pipeline laying and construction of onshore treating facilities. Pipeline activities involve a small work force of resident labor (if necessary skills are available) or imported labor. Offshore pipeline laying could result in minor and rather short-term demands on transient accommodations and community services, and generate some local spending. Onshore pipeline installation could be of longer duration, perhaps a few months, and

would result in similar socio-economic impacts during this period. Impacts that would result from the construction of onshore treating facilities would be a function of the size of the facility. Impacts could range up to a moderate level in their significance. They would involve transient accommodations, possible additional community services (water and sewage systems, etc.), employment, and the indirect effects of local expenditures. The location of such onshore facilities--which would determine the extent and range of impacts--will be decided and determined by local government, as was noted in Section I.B.2.d.

Development refers to the drilling of production wells, usually from fixed platforms. This activity generally takes from one to three or more years, depending on the size of the platform, number of wells drilled, water depth, formation depth, and reservoir characteristics. The work force on a platform typically involves 10 to 25 workers per shift (with three shifts per day). This could have an impact on transient accommodations and community services for a period ranging from one to a few years (depending on the number of wells drilled) in the coastal region adjacent to the particular Sale No. 53 basin. Effects could be minor to moderate depending on the geographic location of activities and how many platforms were in this phase simultaneously. Increased income and expenditures could influence indirect growth in various sectors of the local economy (which could have a beneficial or minor adverse impact) depending on the existing infrastructure of the area near the onshore support base.

Production operations comprise the ongoing function of operating and maintaining production equipment on the fixed platform during the life of the field. Production involves both offshore and onshore operations. Permanent population growth would occur in the region near the permanent support bases with consequent demands on housing and community services. (Permanent onshore operations are projected in the EIS as most likely at Humboldt Bay, San Francisco Bay, Morro Bay, and Port Heuneme.) Employment opportunities would increase. There would be a small long-term demand for onshore electrical facilities. Increased revenues could accrue to federal, state, and local government units. Minor to moderate impacts of both adverse and beneficial nature could occur within specific geographic areas where the support facilities are ultimately located. However, as noted previously, the actual impact would additionally depend on the institutional controls (e.g., zoning, land use plans) in existence in a locality at the time of development.

In conclusion, if exploratory drilling established commercially developable resources, the resulting socio-economic impacts from development of leases included in OCS Sale No. 53 could range from minor to moderate in central and northern California coastal areas. It is unlikely that impacts would be significant during the exploration and development phases. More moderate impacts could be expected during the construction phase--if some platform construction actually takes place in the eastern San Francisco Bay area. The production phase presents the greatest possibility of moderate socio-economic impacts. More long-term onshore and offshore employment would occur during this phase which would likely be centered in those coastal areas having permanent support bases. The localized socio-economic impacts will be delineated in Exploration and Development Plans on particular tracts at the time of their development (Section I.B.8.g.).

7. Impacts on Coastal Land Use: Primary impacts on land use will result from demand for land for facilities necessary for the exploration, development, production and transportation phases of OCS oil and gas activity. In addition, there may be secondary land use impacts caused by the physical demands for land for the additional population. This could result in an increase in the demand for housing, schools, recreation sites, transportation services, and city services. These secondary impacts could be critical at the local level where it is primarily rural and without such an infrastructure already in existence.

While population increases due to OCS, development is expected to be negligible (Table IV.B.3-1), and thus no strain on water supplies, additional water requirements will be created at the OCS-related facilities themselves. Operations bases will require approximately one million gallons of fresh water (largely non-potable) for each exploratory or development well which is drilled. As pointed out previously (Section III.D.2), many of the local areas potentially impacted by the proposal are already experiencing development constraints due to the availabilities of water and sewage capacities.

The following discussion deals with the physical impacts of onshore facilities for OCS development.

This information is based on the NERBC/RALI Onshore Facilities Related to Offshore Oil and Gas Development Factbook (Nov., 1976).

It is important to realize that any development resulting from the proposal (industrial or other), which may occur within the coastal zone, will be subject to the land use controls of the local jurisdictions. These land use controls will be identified and implemented through the Local Coastal Programs (LCP) and Port Master Plans.

Temporary Service Bases are staging areas from which equipment, supplies, and personnel can be ferried by supply boats and helicopters to offshore rigs during the surveying and exploratory or development drilling stage. They require 5-10 acres of flat land on an all-weather harbor; 200 feet of wharf on the waterfront within 15-20 feet of water depth at the pier; and 5,200,000 gallons/rig/year of fresh water during drilling.

Permanent Service Bases are set up as development and production phases get underway with a commercial find. Basically, these bases perform essentially the same functions as temporary bases. The principle differences are size, and intensity of activity. They required 50-75 acres of flat land on an all-weather harbor; 400 feet of wharf on the waterfront with 15-20 feet of water depth; and 8,200,000 gallons/platform/year of fresh water during drilling.

Repair and Maintenance Yards will probably be required to provide services for offshore vessels and equipment. They will require locations accessible to road, rail, and air transportation. It is

unlikely that such yards catering specifically to the needs of the petroleum industry would be newly sited in a frontier area. However, these services could be rendered by existing marine repair capacities and could experience expansion in direct relation to the amount of offshore activity.

Bases Supporting Platform and Pipeline Installation may be located separate from or contiguous to other service bases. Those bases will require flat land for waterfront warehouse space, pipe-coating yards, service/maintenance facilities for the vessels and barges, and possibly land for a helipad. The amount of land required depends on the extent of the commercial find, but at least 5-10 acres and a minimum of 200 feet of marginal wharf is needed.

Pipelines and Landfalls for bringing the oil onshore. Landfalls require a 50-100 foot right-of-way, and, if needed, 40 acres for a pumping station or 60 acres for a tanker and barge terminal. Of this 30-40 feet of soil and vegetation may be removed. Land use impacts are dependent upon whether the pipe must cross marshes, barrier beaches, open fields, or urban areas. This could disrupt other land uses (such as recreation) and life cycles within marshes.

Depending on the location and size of the offshore find, how the oil and gas will be transported, and the ultimate destination of the fuels, the following facilities may be constructed onshore:

Partial Processing Facilities would require 15 acres of flat land per 100,000 barrels of petroleum mixture processed, and 10,000 gallons of water per month.

Gas Processing and Treatment Plants would require 50-75 acres of flat land and 200,000 gallons of water per day.

Marine Terminals would require 30-100 waterfront acres (mainly for storage tanks), and a waterfront with 50-60 foot depth of sheltered water at the pier or mooring buoy.

Refineries would require 1,000-1,500 acres of clear flat land zoned for industry, and 10.5 million gallons of water per day.

Conclusion. The proposed lease sale area could have potentially severe land use impacts onshore in areas where there is no existing OCS oil and gas infrastructure and little petroleum-related infrastructure present. There would be, at least initially, land-use conflicts over space competition within port areas presently utilized by commercial fishing. However, planning and zoning controls implemented through the Local Coastal Programs (LCP) and the Coastal Energy Impact Program (CEIP) should act to mitigate adverse land use impacts. Constraints imposed by water and sewage capacities are likely to be more difficult to mitigate.

Cumulative Impacts. Primary land use impacts will probably be mitigated by consolidation and/or use of presently underutilized oil and gas infrastructure as follows: Pt. Arena Basin, consolidation with Manchester Anticline Petroleum facilities; Bodega Bay and Santa Cruz Basins, use of San Francisco Bay Area facilities; and, Santa Maria Basin, use of San Luis Obispo and Santa Barbara Counties facilities. However, in all areas there will be a cumulative effect of secondary land use impacts in terms of competition with local development needs.

8. Impact on Transportation Systems

a. Shipping: Impacts on shipping from development and production of proposed Sale No. 53 tracts could result from increased shipping and increased employment of crew members. The impact is based on the peak production year of 1990 for Scenario No. 1 (POCS Reference Paper No. 53-1). Increased shipping could result in increased commerce and vessel accidents which are described in the navigation section below. Increased employment would result in increased wages which would be beneficial to local business.

Increased shipping includes barges and tankers from the Point Arena and Bodega areas to the refineries in the San Francisco Bay area. At the peak production year of 1990, crude oil would be transported as follows: 1) a 25,000 dwt tanker would make approximately 81 trips from the Point Arena area to the refineries; and 2) a 15,000 barrel barge would make approximately 130 trips from Bodega Area to the refineries. To help put this in perspective, in 1977, there were 4,221 commercial vessels that entered the San Francisco Bay Entrance (Visual No. 1, Table 1, Corps of Engineers).

At an estimated 0.36 percent increase of commercial vessels per year, the 1990 commercial vessel traffic entering the San Francisco Bay Entrance could be 4,419. The 0.36 percent increase was estimated from McMullen's 9 percent traffic increase over a 25-year period (McMullen 1977). In 1990, the proposed Sale No. 53 tankering and barging could increase the shipping traffic to the San Francisco Bay Entrance by 4.8 percent.

Increased shipping would result in increased direct employment which would increase the secondary employment by an estimated ratio of 3 to 4 1/2 times the direct employment. The direct employment includes crew members estimated for the proposed tankers, barges, crew and supply boats. Tanker and barge transportation routes were described above. Crew and supply boats transportation routes are: 1) Bodega area to Humboldt Harbor and Bay port, 2) Point Arena, Bodega, and Santa Cruz areas to San Francisco Bay, and 3) Santa Maria area to Estero Bay area.

The above transportation would result in generating 113 direct labor jobs at the 1990 operation level which could add approximately 2 1/2 million dollars (1979 dollars) to the local economy in wages. The direct labor wage is based on 1,870 dollars per month. The direct labor jobs of 113 would generate approximately 424 secondary labor jobs at the 1990 operation level. This secondary labor would add approximately 9 1/2 million dollars.

Conclusion. The proposed lease sale could generate some increased direct employment to shipping, and other secondary employment. While the increase in employment is relatively small when compared to total

employment in the regional economy, for certain sectors, locales, and businesses, it could be significant. The impact of a major oil spill on shipping could require a temporary slight rerouting of the ship traffic.

Cumulative Impacts. Cumulative impacts for the production year of 1990 on shipping as a result of the proposed Sale, other projects (Section III.B.6), and estimated commercial vessel traffics would be an increase in shipping traffic and port economics. The shipping traffic through the San Francisco Bay entrance would be increased by approximately 6.2 percent. Increased shipping could generate approximately 141 direct jobs which could add about 3 million dollars (1979 dollars) to the local economy in wages. The 141 direct jobs could generate approximately 529 secondary jobs which could add an additional 11 million dollars.

b. Ports: Impacts on ports from the proposed Sale No. 53 could be from increased employment and possible oil spills impacting the ports. Increased employment at the ports could be considered as part of the secondary employments which were previously described in the above shipping section.

If an oil spill impacted a port, deployment of containment booms or other oil spill equipment could delay the entry or departure of vessels from the port. Analysis of the oil spill model using Transportation Scenario No. 1 indicates that the probabilities of one or more oil spills greater than 1,000 barrels contacting a port could vary from 0 to 6 percent for the proposed sale, and from 0 to 9 percent for the cumulative shipping. The probabilities of oil spills impacting a port (Visual No. 2, Table 1) for the proposed sale are: 1) Humboldt Bay and Harbor-0 percent, 2) San Francisco Bay Entrance-2 percent within 3 days, 5 percent within 10 days, and 6 percent within 30 days, 3) Moss Landing-0 percent within 3 and 10 days, and 1 percent within 30 days, 4) Pillar Point Harbor-20 percent within 30 days, 5) Santa Cruz Harbor-less than 5 percent within 30 days, 6) Morro Bay Harbor-60 percent within 30 days, and 7) Port San Luis-21 percent within 30 days.

Conclusion. The proposed lease sale could generate some increased secondary employment to the ports. While the increase in employment is relatively small when compared to total employment in the regional economy, for certain sectors, locales, and businesses, it could be significant. The impact of a major oil spill on the ports could delay the entry or departure from the ports. Demand for port facilities from the oil and gas industry and other users would probably result in increased use of limited space and port resources. Increased user charges and/or expansion of port facilities would likely result. The extent of these changes would largely be determined by local planning agencies.

Cumulative Impacts. Cumulative impacts on ports as a result of the

proposed Sale, other projects (Section III.B.6), and estimated commercial vessel traffics would be an increase in vessel traffic, port employment, and probabilities of oil spills. For information on increased vessel traffic and port employment see previous section on shipping (IV.B.8.a). During the Humboldt Harbor and Bay improvement project (Section III.B.6) the increased vessel traffic would be short-term until the project is completed.

The cumulative probabilities of oil spills impacting the following ports are: 1) Humboldt Bay and Harbor-0 percent; 2) San Francisco Bay Entrance-4 percent within 3 days, 8 percent within 10 days, and 9 percent within 30 days, 3) Moss Landing-0 percent within 3 days, 1 percent within 10 days, and 3 percent within 30 days, 4) Pillar Point harbor-24 percent within 30 days, 5) Santa Cruz harbor-less than 5 percent within 30 days, 6) Morro Bay Harbor-6 percent within 30 days, and 7) Port San Luis-22 percent within 30 days.

c. Navigation: Impacts on navigation during exploration, development, and production could be from vessel traffic using traffic lanes crossing the proposed tracts and from vessel accidents. Restriction of exploration and development in traffic lanes could increase the cost of exploration and development of the proposed tracts. Vessel accidents are based on Transportation Scenario No. 1 at the peak production year of 1990. These accidents could result in loss of human lives, personal injuries, property damages, and oil spills.

The proposed traffic separation scheme (TSS) from Point Conception to the California-Oregon border is described in Section III.3.b and illustrated in Visual No. 2. The traffic lane entrances from the north-south TSS to Humboldt and Estero Bays are 1-nm wide. The traffic lane to Humboldt Bay crosses the following Eel River area tracts: 019, 020, 021, 022, and 023. The traffic lane to Estero Bay crosses the following Santa Maria tracts: 129, 130, 131, 132, and 133.

In comparison of cost between tracts with and without traffic lanes, the cost of exploration and development of tracts with traffic lanes could be substantially higher. The higher cost could be mostly during development where two fixed platforms, one on each side of the traffic lane, may be needed instead of one. Also, directional drilling could be required. Development of shallow petroleum structures may prohibit the use of fixed platforms and a subsea completion system may be needed to develop those structures.

Estimates on accidents of any sort, that are caused by vessel traffic, are based on an equation of 8.2×10^{-5} vessel accidents per ship movement (McMullen 1977). The second assumption is that the ship movement for the proposed sale is the number of round trips made by the proposed tankers and barges. Vessel accidents could be caused by vessels crossing the traffic lanes, vessels not adhering to the traffic

lanes, vessels ramming into offshore structures, and vessels running aground.

At the peak production year of 1990, the Sale No. 53 proposed shipping would include 81 round trips by 25,000 dwt tankers to and from the Point Arena area to the refineries in the San Francisco Bay area, and 130 round trips by a 15,000 barrel barge to and from the Bodega area to the same refineries. Based on total round trips of 211, Sale No. 53 could cause an increase of 0.02 vessel accidents in the peak year 1990.

Offshore platforms could provide a benefit for navigation with lighting, distinct marking and color, fog horn, radar, and other navigational aids.

McMullen (1977) had indicated that the introduction of the vessel traffic lanes (Traffic Separation Scheme) in the Santa Barbara Channel in 1969 had represented a major change in the Channel vessel traffic procedures. During the 8-year period of established traffic lanes, there were no collisions or casualties in the Santa Barbara Channel.

The Twelfth District Coast Guard has proposed a Traffic Separation Scheme (TSS) between Point Conception and the California-Oregon Border, as described in Section III.B.3.a. Without any established TSS, the above described vessel accidents could be much higher. In addition, the Twelfth District Coast Guard is recommending the following mitigating measures for platforms/structures located within 2 nautical miles of designated traffic lanes:

Paint platforms/structures white and/or yellow to enhance their visibility in haze and fog. Require this coating to be maintained during the existence of the platform.

Require reliable automatic emergency sources of power for platform's aids to navigation and vital control systems with a capacity for at least 48 hours of operation. NOTE: Some platforms are unmanned or manned part time, and receive electrical power by cable which may or may not be buried.

Consider radar reflection enhancement measures on small platforms.

Conclusion. Traffic lanes crossing the Eel River and Santa Maria tracts could increase the cost of exploration and development substantially. The estimated vessel accidents during the proposed sale development and production could be small unless the proposed California-Oregon border to Point Conception traffic separation scheme is not established.

Cumulative Impacts. Cumulative impacts on navigation as a result of the proposed Sale, other projects (Section III.B.6), and estimated commercial vessel traffic would be an increase in vessel traffic which

could cause increase in vessel accidents. The vessel accidents could be small unless the proposed California-Oregon border to Point Conception traffic separation scheme is not established.

For the peak production year of 1990, cumulative shipping entering the San Francisco Bay would include traffic from the proposed Sale, Elk Hill Projects, OCS Sale No. 48, and the estimated commercial vessels. Estimated vessel accidents for 1990 could be 0.02 for the proposed Sale; 0.04 for the combined proposed Sale, Elk Hill Projects and OCS Sale No. 48; and 0.40 for the cumulative which includes the estimated commercial vessels.

d. Others. Impact on other transportation systems from proposed Sale No. 53 could be from increased petroleum-related vehicles in State Highway No. 1 and from oil spill in the Diablo Canyon Power Plant operation.

Impact on California State Highway Route No. 1, during oil and gas development phase, could be from increased petroleum-related vehicles using Route 1 during pipeline construction in Mendocino County during summer months (De Levin, 1980). Construction of offshore and onshore pipelines could take approximately three months. Therefore, to offset the high traffic density during the summer months, pipeline construction could be scheduled off the summer months.

If an oil spill impacted the South Cove area, Diablo Canyon Nuclear Electrical Generating Plant's cooling water intake location, there would probably be no impact to the power plant operation unless the oil is extremely viscous. The cooling water intake is located approximately 20 feet below the water surface. In case the viscous oil should enter the intake to the cooling water system, the foul-up in the condenser would probably cause one or two days of plant shut-down (Schaffer, 1980). The probabilities of oil impacting South Cove within 30 days is 21 percent.

Conclusion. Gas pipeline in Point Arena tracts to Mendocino County should be constructed off season from the summer months to avoid impacting the heavy vehicle traffics on State Highway No. 1. Oil spill near the Diablo Canyon Nuclear Electrical Generating Plant could cause a plant shutdown of one or two days.

Cumulative Impacts. Cumulative impacts on other modes of transportation as result of the proposed Sale, other projects (Section III.B.6), and estimated commercial vessel traffic should be small except on State Highway No. 1 and Diablo Canyon Nuclear Power Plant. The Manchester Arcticline Petroleum Project (Section III.B.3) could further impact the vehicle traffic on Route 1 in the Mendocino County. The cumulative probabilities of an oil spill impacting the Diablo Canyon Nuclear Power Plant is 22 percent within 30 days.

9. Impact on Military Uses

Military: Impact on military operating areas from the proposed Sale No. 53 tracts are illustrated in Visual No. 1 and described under military use (III.B.5).

Stipulations 1 (a,b,c) and 2 include Tract Nos. 129-243 in the Santa Maria area. Stipulations 1 (a,b,c) as modified by 1d and 2 include Tract Nos. 63, 65-68 in the Bodega area and Tract Nos. 69, 70, 73, 74, 77-79, 82, 83, 96, 100, 104, 105, 108, 109, 114-116, and 119 in the Santa Cruz area.

Conclusion. All of Santa Maria tracts and part of Bodega and Santa Cruz tracts are impacted by military operation and will require coordination with the military.

Cumulative Impacts. Cumulative impacts on military uses as a result of the proposed Sale and other projects (Section III.B.6) would be greater than the impact for the proposed Sale as described in this section. The other projects would increase the surface traffic within the military areas.

10. Impacts on Archaeological and Cultural Resources

a. Impacts on Marine Cultural Resources

i. Sources of Impact During Exploration:

Preliminary exploration activities potentially impacting cultural resources include coring for sediment or stratigraphic samples and dredging for rock or sediment samples. Impact from these sample activities is relatively slight, however, either because small areas of the ocean floor are involved or because bottom disturbance is shallow. It is likely that most preserved cultural resources are protected to some extent by overlying sediment. If core samples were archaeologically analyzed, resulting data would provide information useful in topographic reconstruction and archaeological site information.

Explosives may be used in deep seismic work during this phase, but the potential for widespread negative impact is not high because explosives are seldom used in areas shallow enough to contain high concentrations of resources. However, severe damage to specific sites could occur, as happened to the USS MONITOR during World War II.

The use of a drillship for exploratory drilling brings a higher risk to cultural resources. This phase may last a period of weeks or months. Direct impact can occur from drilling, although the risk is slight because the actual drillsite is small. As the size and number of drillsites increase, so does the potential impact risk. Anchoring activities produce a high risk because they result in disturbance of large areas of seafloor. The diameter of the gross affected area may be as much as 12 times the water depth, and the diameter increases with each change in anchor location. Weight and drag of anchor, chain, and cable continually gouge the bottom. Anchor recovery, either by drag or by tag line and buoy, also results in bottom disturbance. Old anchor scars on the bottom are frequently seen in side scan sonar surveys.

Another likely source of potential impact is the use of divers, who may be employed to explore for hazards or to recover lost equipment. Divers may collect artifacts for themselves or others or may disclose the location of submerged resources to others who might salvage or plunder them. Such losses have occurred all too often in other areas.

Indirect impact can result from the accumulation of debris on the bottom from work crews. Debris may include those tools and supplies lost overboard; it may also include illegally jettisoned waste or surplus supplies (e.g., pipe, cable). This debris results in magnetic anomalies and side scan sonar images that will interfere with remote sensing analysis in future cultural resource surveys. Another hazard to surveys is caused by the operation of motors, winches, pumps, and various other equipment on the drillship (and on rigs installed for development) that creates a spectrum of sound and electromagnetic frequencies and magnetic

fields. This creates noise that will show up on the records of remote sensing surveys undertaken in nearby areas.

ii. Sources of Impact During Development/Operation: The initial source of potential impact during the development/operation phase is the construction of platforms and the drilling of wellsites. Platform construction results in a great deal of bottom disturbance because of the large area of seafloor covered and by the numerous pilings sunk to secure the base. Large magnetic gradients extending for great distances are created by the platforms, and acoustic frequencies are created that may cause noise in sonar records. Well sites may be drilled directly below the platform or at some distance away and connected by pipelines to the platform. Magnetic fields influencing large areas are created as pipelines and cables are laid between wells and platforms, adjacent platforms, and platforms and shore. Debris accumulation continues around the platforms and may be accelerated with increased traffic in the area. Anchoring activities continue to disturb the bottom as tankers, work boats, and supply boats service the platform. Noise continues, as with the drillship, from equipment operation that could influence remote sensing records compiled for nearby areas. Rigs, helicopters, and boats are sometimes lost. As these lie on the bottom, they produce anomalies potentially masking the identification of cultural resources. Pipeline laying creates additional bottom disturbance due to anchoring activities of lay barges and to the dredging required to bury pipeline in shallow areas, and debris accumulates along the pipeline route as the pipe is laid.

Oil spills are a source of potential impact on cultural resources, although there is a relatively low risk for submerged material. Many of these resources are protected from direct contamination by overlying sediment. Spill impact on marine resources would most likely be in the form of contamination that would alter the appearance of small objects or interfere with radiocarbon dating. However, there is a relatively low risk of direct contamination. It is only the most viscous oil that is likely to reach the bottom. This tarry oil would probably not coat the surface of most resources because of protection of sediment.

iii. Sources of Impact Post-Production: The top of the steel well casing is blown off with explosives a few meters below the mudline after the well has been plugged for abandonment. The explosives used in this procedure could possibly damage nearby cultural resources. The rest of the casing, which may be several meters long, remains in the well, creating a large magnetic anomaly that may affect the accuracy of future remote sensing surveys. Although records of wellsites are maintained, accuracy and completeness have been problems in other lease areas. However, with the use of remote sensing surveys in selected areas, it is possible previously unknown resources will be located. Several shipwrecks in southern California have been located by such surveys. Removal of the platform and seafloor obstructions due to

wells and wellheads may result in considerable bottom disturbance. Dragging the bottom to salvage debris also results in bottom disturbance. Unrecovered metallic debris could affect future remote sensing surveys.

iv. Tankering Impacts: Tankering increases any risks from oil spill. A tanker could sink and become an anomaly source which could mask nearby weaker anomalies. Tankers anchored near platforms while loading or waiting to load could present a hazard to submerged sites if the area had not been adequately surveyed ahead of time. Although not generally anchored directly, impact could result from emplacement of anchoring buoys. Propeller wash of these deep draft vessels disturbs unconsolidated sediments in shallow waters. This disturbance can be visible in side scan sonar records.

mitigation. Lease Sale No. 53 encompasses 2,187 square miles of seabed, much of it in very deep waters. The vast area and depths involved make any archaeological search very difficult. The primary method of archaeological investigation on the OCS is remote sensing (magnetometer, sidescan sonar, subbottom profiler), which is used in areas \leq 120 meters deep. In these areas, considered especially sensitive, BLM requests that USGS invoke stipulation no. 3, which requires archaeological analysis of the remote sensing data collected by the lessee. The methods by which this stipulation is implemented are specified by a periodically updated Notice to Lessees (NTL). NTL 77-3 is currently in effect.

If potential cultural resources are identified as a result of the remote sensing survey, BLM requests that the operator identify the object(s) through additional survey (e.g. remote camera, divers) as a non-resource, or avoid the object(s). Based on past leasing experience in southern California, BLM expects that in most cases the operator will choose avoidance without identification. Protection of resources by avoidance is an appropriate form of mitigation. However, there is no system for monitoring proposed avoidance by the operator.

Conclusion. Because of the large number of historic vessels lost in the waters of the proposed sale area, it is likely that some loss of these resources will occur during the life of the leases as the result of development. It is also possible for damage to occur to aboriginal sites in those areas with a potential for the occurrence of such sites.

b. Impacts on Terrestrial Cultural Resources:

Terrestrial cultural resources that will be potentially impacted by Sale No. 53 include recorded and unknown aboriginal and historic archaeological sites; historic structures; traditional Native American ceremonial and subsistence gathering sites; and sacred lands, landmarks, and buildings.

Sources of potential impacts include: offshore exploration, development, and operations; oil spills; land use changes; and construction and operation of onshore facilities (e.g., docks, storage tanks, pipelines).

i. Oil Spills: Damage to archaeological resources could come from oil contamination. Historical and archaeological materials soiled by an accidental oil spill may not survive subsequent cleaning and restoration efforts. The identity of very small artifacts could be masked by a heavy oil coating. Porous materials could be rendered unsuitable for carbon dating techniques. The probability of such a polluting event interacting with artifacts is low and the potential for significant destruction or loss of archaeological resources appears small, although it does exist. The primary risk to terrestrial archaeological sites in oil spills is the associated cleanup activities using heavy equipment that could result in damage to cultural resource sites located in the surf zone, upper splash zone, or beach and bluff areas. Picking up sorbents or sand with heavy equipment may damage sites, although those exposed to swells or waves may already be reworked in the shallowest layers. Construction of roads necessary to reach shoreline areas with equipment could affect sites in dune or bluff areas. The crisis atmosphere that may ensue following a spill could preclude adequate survey or site marking prior to cleanup activity. The impact potential depends upon the number of sites at the strand and the spill risk to particular shoreline segments. Oil spill and associated cleanup activities would be considered spiritual intrusive to areas of religious concern to Native Americans.

The greatest risk to cultural resources from oil spills is to the traditionally gathered foodstuffs used for subsistence or ceremonial purposes by Native Americans. Such foodstuffs include seaweed, abalone, mussels, sea anenomes, periwinkles, eels, and many types of fish. Those foodstuffs used for subsistence by coastal dwellers are primarily those found in the intertidal zone, and are those most likely to be impacted in the event of an oil spill. The trajectories projected by the oil spill model for Sale No. 53 do not hit any known gathering sites; however, it is likely that many, if not most, gathering sites are unknown to BLM.

ii. Air Quality: Air quality will decrease slightly within the area of potential environmental impacts, thus increasing the possibility of pollution effects from development of the Santa Maria tracts on Native American rock art. According to Lee (1979,

personal communication) there are "at least twelve rock art sites from Point Conception to Cambria, all within 5 miles of the coast." The potential impact on these sites is not possible to predict with certainty because of its dependence on the amount of resource and its development, but it is expected to be negligible.

iii. Visual and Auditory Intrusion: The value of some cultural resources is to some extent dependent on the integrity of their original environmental setting. For example, historically important lighthouses are subject to impact by visual intrusion of their marine environments if onshore or offshore construction related to oil and gas development (e.g., oil rigs) occurs within the field of view. The closer the intrusive structure, the greater the impact. Noise associated with development could also be intrusive.

These lighthouses of historical importance will be potentially subject to this type of intrusion as a result of Sale No. 53: Point Cabrillo, Point Arena, Point Montara, Pidgeon Point^a (see Visual No. 8 [cultural resources]). The ability to see a structure from a lighthouse is dependent on the height of the lighthouse and on weather conditions. Maximum visibility would be approximately 13-20 miles, but only on the clearest days. Most of the time visibility is much decreased because of inclement weather. The degree of potential visual impact on the above lighthouses will be dependent upon the number of structures within the range of visibility, but is expected to be slight to none.^b No structure could be built closer than three (3) miles from shore. Camouflage of offshore structures is not feasible because of the expense and the hazards to navigation that would result.

iv. Spiritual Intrusion: To those individuals or groups who believe a particular area, landmark, or building has a sacred quality, industrial development may be considered an impact on the spiritual quality of a site.

There are many coastal areas in central and northern California that are considered by Native Americans to be vulnerable to spiritual intrusion by offshore development. For example, according to Native American consultants, those who consider Point Conception^c sacred feel that construction of marine facilities nearby would be detrimental to their ability to communicate with the Great Spirit. It is also believed that souls of the dead, who must pass through the "Western Gate" at Point Conception, will be impeded in their progress to the afterworld. Although any development in proximity to such sites is considered intrusive, whether seen (e.g., oil rigs) or unseen (e.g., submerged pipelines), those structures and activities that are most visible are the greatest concern. Because most of the sites sacred to Native Americans are unknown to others, it is not possible to completely assess the potential impact of offshore oil and gas development on this type of resource. However, the only tracts in Sale No. 53 with a known

^aNational Register Historic Site.

^bNo impact of this type from this undertaking would occur from nearby tracts if they are not leased, or if there is no exploration/development on them.

^cSite nominated to the National Register of Historic Sites.

potential for this type of impact to Native American sites are No. 060 and No. 243, which, if developed, are close enough to religiously important areas to be considered intrusive.

The Mendocino Chinese Temple, built in honor of the deity Kwain Dai, has recently been nominated to the National Register of Historic Places. Ownership of the Mendocino Chinese Temple has remained with the Hee family, now the only Chinese family in Mendocino, for 108 years. According to the Chinese Historical Society of America (Wey, 1979, personal communication), the "presence of offshore oil drilling apparatus", by blocking the ocean view from the temple, would constitute an intrusion to those individuals who worship there and to those who consider the Temple sacred. Any visible offshore development would be considered intrusive to these individuals. It is believed that the marine environment of the Temple must remain in its original condition for the bodies and souls of worshipers to be able to return to China. The extent of such an impact on the Temple will depend on the location and extent of lease activities, but is expected to be small or none.^a

v. Terrestrial Development: Terrestrial development related to offshore oil and gas is a potential impact to archaeological sites, which may not be discovered with certainty by surveys. Those which remain undiscovered may be damaged or destroyed if development occurs. When an archaeological site must be excavated because no other mitigatory option exists, values to future investigators may be permanently lost. Unavoidable damage to historical or pre-historical values will occur when sites are not identified in time for preservation. Concealment of finds by contractors could also result in their destruction. These impacts would be permanent. The possibility of pot hunting or pilfering is increased whenever human activity is introduced or increased in an area.

Land use change and resultant development is a potential impact on known and unknown cultural resources. Changes in the environmental context of an historically important site or structure could affect the resource. The degree of such impact will be dependent on the amount and location of onshore development. There is a possibility some terrestrial resources will be negatively affected.

c. Cumulative Impacts: Some limited, positive impacts could result from a general increase in the knowledge of cultural resources because of survey work done in conjunction with exploration and development. The sale of many leases in proposed Sale No. 53 will affect areas in central and northern California not previously subject to these particular sources of impact. Quantification of potential impacts is not possible without knowing the amount of the resource present and the efficacy of resource surveys.

d. Conclusions: The shallower waters of the OCS off

^aNo impact would occur if nearby tracts are not leased, or if there is no exploration/development on them.

central and northern California have an excellent potential for prehistoric and historic cultural resources. Submerged aboriginal sites are particularly important to scientists because of their potential contribution to anthropological theory regarding the peopling of the New World. This proposal could commit some areas of relatively shallow waters of the OCS to a permanently disturbed condition. Shipwrecks in the deep, cool waters of the OCS are likely to have been well preserved; their well-preserved condition should last a great many more years if they are not disturbed.

This proposal will place large and relatively permanent sources of magnetic anomalies on the outer continental shelf during the 20-40 year life of the proposed project by the presence of platforms, pipelines, and cables. After abandonment, remaining piling and well casing below the mudline will create large permanent magnetic anomalies. This will complicate or even preclude search for antiquities and modern objects (ships, aircraft, etc.) alike. Many anomalies may have to be investigated which are of no cultural value but which may emulate the signature of objects or sites. Similarly, bottom disturbance, submerged objects, drill pipe, sundry debris, even work-boats create images in the sidescan sonar records that may have to be investigated. It is likely there will be some loss of historic and prehistoric resources which will occur as a result of lease development.

Physical disruption would occur if construction activities took place on undetected or ignored terrestrial cultural resource sites. The severity of the impact would vary with the significance of the resource and the level of damage or disruption. These types of impacts would arise from pipeline construction and burial and other construction such as operations bases. State protective requirements probably would be mitigatory in most terrestrial areas. These types of impacts would arise from pipeline construction and burial and other construction such as operations bases. The presence of workers and supervising staff in the area enhances the prospects for pot-hunting and vandalism.

Both on and offshore, mitigation of possible impact on a site or object by salvage constitutes an irreversible and irretrievable loss of some of the information contained therein. As archaeological research, salvage, and analytical techniques improve, so does the amount and quality of information recoverable. Sites left undisturbed until more advanced technology and methodology by future archaeologists is used will likely yield much greater data rewards. Similarly, conservation work by which materials and artifacts are restored improves steadily. If sites are destroyed or damaged in the press of an oil spill emergency or during clean up work, a permanent loss of a nonrenewable resource occurs. During the life of the proposal, the visual environment of some listed or eligible National Register sites may be affected.

With the best of diligence in survey and analysis, some objects or sites

may remain undetected and thus vulnerable to destruction or damage. With less diligence, most or all of the cultural resources on particular tracts will remain undiscovered and vulnerable to loss, destruction, or damage. Irretrievable or irreversible loss will occur if valuable antiquities are pilfered by unauthorized divers or "pot hunters". Use of unqualified archaeological personnel and/or information disclosure can and has resulted in this kind of loss.

An important safeguard for this heritage of cultural resources is a continued awareness of its vulnerability.

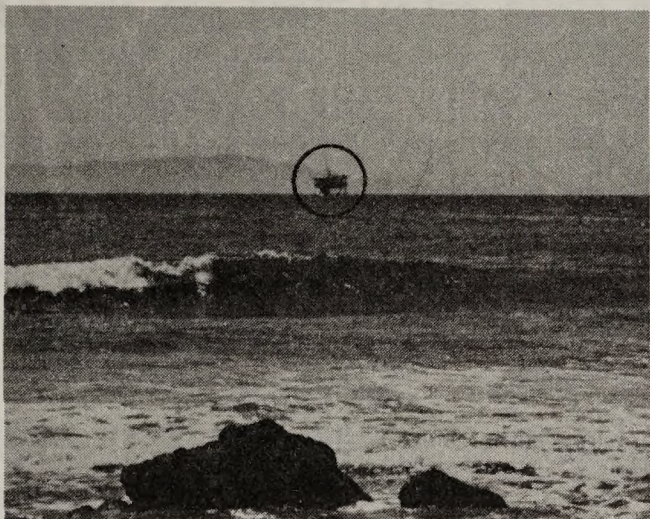
Benefits will result from the proposed sale in the form of increased knowledge of cultural resources in central and northern California and possible identification of previously unknown resources.

11. Impacts on Visual Resources: Social, economic, cultural and philosophic backgrounds greatly vary one's perception of esthetic values. The sight of an offshore drilling platform may significantly decrease one observer's enjoyment of the coast, while another would be unaffected. In this analysis we have identified, from an architectural and artistic standpoint, the nature of visual resource impacts. The magnitude of that impact cannot be quantified because of these differences in individual perception.

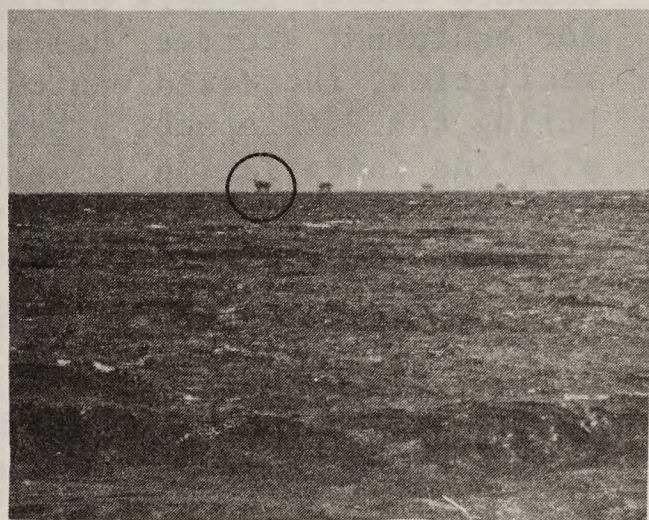
Offshore oil and gas development and related onshore support facilities will have an adverse impact on visual resources, the degree depending upon the nature and number of the facilities and their location. Visual resource degradation could decrease recreational enjoyment of the beaches and coastal waters for some people. This, in turn, may adversely affect tourism, especially in highly scenic areas.

The degree of visual impact for both onshore and offshore facilities can be evaluated in either of two ways: 1) impacts increase in magnitude when they occur in a highly scenic area, or, 2) impacts increase in magnitude when they are visible to greater numbers of people. Under criteria 1, OCS development would produce the greatest adverse impact in the Bodega, Point Arena, and Santa Cruz tract blocks owing to the large amount of Class A scenery adjacent to these tract blocks. Smaller amounts of Class A shorelines are adjacent to the Santa Maria and Eel River tract blocks. Most of the Class A locations are in areas that are largely natural environments, thus, solitude values in these areas will also be impacted. Most of the coastal sections adjacent to Sale No. 53 tracts are heavily used for recreational purposes. Criteria 2 impacts would be most severe for the Santa Cruz tracts since millions of Bay Area residents use these beaches each year. The Santa Maria coastline is heavily used by residents of southern California, thus, impacts would also be more pronounced in that area.

Offshore platforms will cause the longest lasting, most prominent visual impact and are the most difficult to mitigate. Some portion of a 190-foot structure can be seen from the water's edge if it is located within 17 miles of the shoreline. From elevated vantage points, the visual range increases in proportion to elevation. At distances beyond about 15 miles, the size of platforms would appear very small and would be obscured by natural sea haze from 40 to 60 percent of the time. Dense fog and haze will obscure platforms situated at the 3-mile limit between 5 and 30 percent of the time, depending upon local climatic features (Naval Weather Service 1976). Offshore platforms are fairly prominent objects exhibiting discordant vertical and angular lines against the soft plane of the sea (see Figure IV.B.11-1). In all Sale No. 53 lease block areas, the visual impact of offshore platforms is increased since there is no existing offshore development and because the shorelines are generally undeveloped with little industrialization. Other offshore visual impacts include increased offshore vessel and air



3 Miles from Platform



5 Miles from Platform



10 Miles from Platform

Figure IV.B.11-1 Visual Impact of Oil Platforms

traffic, and locally decreased water clarity. These are transitory short-term impacts and, thus, not significant.

Onshore visual impacts during exploration could entail land use changes for equipment storage, heliports, communication and navigation equipment facilities, increased vehicular traffic and construction activities. During the development stage, onshore storage and processing facilities, pipeline installation, pipeline and barge fabrication and equipment storage yards will all involve some deterioration of the visual resource onshore. Sensitive design, siting, choice of materials and landscaping could reduce the visual impact of these installations. Despite these potential mitigations there is a possibility of some visual resource deterioration, particularly in undeveloped areas. The duration would extend through the life of the petroleum fields, to about the year 2005, with gradual lessening of the visual impacts thereafter.

A significant visual impact would occur onshore in the event of a major oil spill. Accidental spills could occur as a result of vessel loss, production equipment failure, pipeline ruptures, and well blowouts. Some low-level spillage will occur during the course of normal operations. The duration of the beaches oil fouling ranges from a few days to years, depending upon the amount of spillage, extent of cleanup efforts, beach sand transport mechanisms, oil composition, etc. Any oil fouling of beaches would have an adverse effect on visual quality until the oil is recovered by either cleanup efforts or natural processes.

Conclusion. Because of individual differences in perception, the magnitude of visual resource impacts cannot be quantified. For most observers, it is believed that Sale No. 53 and related development would cause visual resource degradation in those areas where development occurs.

Cumulative Impacts. Cumulative impacts to visual resources would come from three main sources: spilled oil, offshore platforms, or onshore construction activities. The only area where a significant increase in cumulative impacts from spilled oil would occur is San Miguel Island. Existing oil spill hit probabilities are 23 percent. The proposal would add 11 percent, bringing the cumulative total to 34 percent. This island is primarily visited by scuba divers, fishermen, and boaters. Oiled beaches/shoreline could have a moderate impact here based upon the number of sportsmen and then use of the area. There will be no cumulative offshore impacts from platforms since there are no platforms in the Sale No. 53 area. Onshore cumulative impacts are expected to be minimal.

12. Unavoidable Adverse Impacts

a. Air and Water Quality

Air. OCS oil and gas development related to Sale No. 53 would slightly increase pollutant levels in adjacent onshore areas. A moderate increase in ozone levels in the Santa Maria area could also occur. Various technological controls and offsets are available to reduce these impacts. Based upon the information presented in reference paper 53-5, technological controls could reduce VOC emissions (ozone precursors) by up to 90 percent. Thus, any significant adverse impacts upon air quality could be largely mitigated. The DOI will require the use of such controls sufficient to prevent significant onshore air quality degradation.

Despite the application of control measures, some small deterioration of onshore air quality will occur. If a large spill or fire were to occur, local air quality would be temporarily degraded. The extent of degradation is dependent upon weather conditions at the time of the incident.

Water. Normal offshore operations would have unavoidable effects of varying degrees on the quality of the surrounding water. Drilling, construction, and pipelaying would cause an increase in the turbidity of the affected waters for the duration of the activity periods. In the case of pipelines, settled pollutants could be disturbed. A turbidity plume, several hundred yards in length, could also be created by the discharge of drill cuttings and the adherent drilling fluids. This, however, would only affect waters in the immediate vicinity of the rigs. The discharge of treated sewage from the rigs and platforms would increase the levels of suspended solids, nutrients, chlorine, and BOD in a small area near the discharge points. Chronic spills from platforms and the discharge of formation waters will result in increases of the hydrocarbon levels and possibly trace metal concentrations in the water column. Overall, the effect will be the degradation of water quality up to 20 kilometers from platforms under worst case conditions.

In the case of an accidental spill, unavoidable deleterious effects to offshore water quality would result. Spilled oil that is not recovered would release hydrocarbons and trace metals into the environment. The quality of the surface, near surface, and to a lesser extent, deeper waters would, therefore, be lowered for the duration of the spill. If oil is entrapped in bottom or shoreline sediments, this degradation would continue over weeks, months or even years while the oil was slowly reintroduced into the system. There is a statistical probability that a total of 2.29 spills greater than 1,000 bbls. will occur as a result of proposed Sale No. 53.

Unavoidable impacts to onshore water quality will also occur caused by runoff from construction and sewage from the increases in population resulting from OCS activities.

b. Marine and Coastal Ecosystems: In all proposed lease sale areas, minor decreases in plankton, benthic organisms, seagrasses and algae will occur in localized areas of high turbidities generated by drilling fluids disposal and bottom sediments suspended by pipeline laying and burying operations. The possibility exists that toxic materials used in mud mixtures may adversely affect some marine organisms in localized areas when the drilling fluids and cuttings are discharged.

Disruption will occur if fresh oil spills reach sensitive biological features in all OCS leasing areas. Localized severe motablities, probably selective, and functional impairment would probably occur, thereby altering the community structure for an unknown period of time.

Adverse impacts could occur to endangered and threatened species of marine mammals and birds having the potential to cause a drastic reduction in existing sea otter population. The most serious potential impacts would occur from major oil spills and chronic oil pollution.

c. Commercial Fisheries: The most significant adverse impacts proably will be from oil spills. Since 2.29 oil spills greater than 1,000 bbls. are predicted over the life of the project, impacts resulting from oil spills will be unavaivable. Low to moderate ecological losses to surface fishes probably will be unavaivable and high ecological losses to salmon and other anadromous fishes could also occur. The Offshore Oil Pollution Compensation Fund was created to compensate for these and other losses. Losses related to fishing gear snagging on offshore manmade obstructions will be unavoidable. The Fishermen's Contingency Fund will usually compensate for these losses when no responsible part can be identified. Offshore structure also could unavoidably cause physical disruption of Petrale and Dover sole spawning grounds in the Eel River Basin. Minor conflicts onshore will be unavoidable even with careful consideration of the commercial fishing industries' interests. Drilling muds and cuttings could significantly affect fish and invertebrate populations and their fisheries especially when there are important spawning areas within the lease tracts (e.g., the Dover and Petrale sole spawning grounds int he Eel River Basin) or when the fishery is limited and a significant part of that fishery occurs within the lease tracts (e.g., the spot prawn fishery in the Santa Maria Basin). It is likely that these potential conflicts can only be avoided if drilling muds and cuttings are required to be barged ashore.

d. Recreation and Sportfishing: The adverse impacts on recreation that could be encountered if the proposed sale occurs are: 1) the temporary disruption of recreation areas caused by pipeline

burial, 2) the competition for land between recreation and OCS-related onshore facilities, 3) the degradation of the aesthetic (visual) environment conducive to recreation, and 4) the damage to recreational sites caused by an oil spill. The first two impacts could largely be mitigated through careful site selection and by timing the construction of OCS facilities for the non-peak season. The third impact could be reduced by using primarily subsea completion for production. When an oil spill occurs, the extent of the recreation impact is dependent upon the location and size of the spill, the time of year in which the spill occurs, and the time required for the cleanup.

A major spill would largely preclude any recreational activity in the affected area. Should oil impact a beach or marine reserve, the recreational use of that facility will be eliminated or dislocated until cleanup procedures have been completed and the facility restored to a desirable, usable state. The use which the impacted beach would normally receive could be temporarily transferred to surrounding beaches (if available), which might cause crowding and ultimate denial of beach areas to some people. Oil spills could temporarily close marinas and boat launching facilities. This would deny many boaters the opportunity to participate in the activity. Waterfowl areas could be closed for a fairly long duration (up to several years). Also the spill could result in bird mortality which would preclude hunting activities.

Oil spills will have a minor unavoidable adverse impact on sportfishing if they occur or move into a sportfishing area since fishing would be temporarily discontinued until cleanup has been completed due to the possibility of gear and vessels being contaminated and fish tainted. Additionally, boats may be confined to port by oil containment booms. A major spill could have temporary economic impacts upon operators of passenger carrying fishing vessels who rely upon sportfishing activities for their living, and on local tourist industries that rely on their marine resources to attract visitors. The California Department of Fish and Game has identified tracts in the Point Arena Basin that are near important abalone harvesting areas (see the Sensitive Biological Areas alternative). A major spill could also affect sportfishing by impacting fish and invertebrate populations (see discussion under commercial fisheries). Declines in salmon populations probably will have the most significant impact. The Offshore Oil Pollution Compensation Fund was created to compensate for these and other losses. Discharges, effluents and vessel traffic essentially will impact sportfishing as they impact commercial fisheries (see discussion under commercial fisheries).

e. Socio-economic Factors: The migration of labor, capital, and materials to primary impacted areas during the early years of oil and gas operations, and the subsequent out-migration of some of these people and resources during the later years cannot be avoided should the sale take place and if commercially recoverable amounts of oil and gas are found.

When a given area is unable to absorb needed infrastructure expenditure, and economic activity cannot be shifted elsewhere, shortages of supply and dislocations in local economies may result. Problems with allocating the production of goods and services may occur, and consumers within the locality may be affected adversely. Consumption patterns and production patterns would eventually shift so as to remove excess demand, but this adjustment is not immediate and dislocations may be experienced as the local economy works its way to equilibrium. Areas with low population densities and limited industrial bases would be the most likely to experience such adverse impacts. Adverse socio-economic impacts are anticipated to be very minor.

f. Navigation: A certain amount of interference between offshore structures and vessel traffic will occur as a result of the proposed sale. This could lead to an increase in accidents involving vessels in the OCS area. Some areas which may crisscross the offshore leasing areas have traditionally been used by oceangoing vessels but have not been officially established as traffic lanes. There is a higher probability of accidents occurring in heavy traffic areas. The U.S. Coast Guard's proposed Port Access Routes (PAR's) offer one technique through which the incidence of these accidents could be reduced.

Very little navigational interference can be expected between ships utilizing established fairways. However, at night, and especially during rough weather, fog and heavy seas, ships which are not navigating the fairways could collide with fixed structures resulting from these proposed sales. Also, fishing boats engaged in trawling will be inconvenienced by having to navigate around fixed structures located on fishing grounds.

g. Cultural Resources: There is a small possibility that unknown archaeological and/or historic artifacts and sites exist within the proposed lease sale area. Cultural resource surveys may not detect with certainty all such sites or artifacts. Those materials within undetected sites could be damaged or destroyed by subsequent oil and gas activity such as structure siting and anchoring.

Other damage to archaeological resources could come from oil contamination. Historical and archaeological materials soiled by an accidental oil spill may not survive subsequent cleaning and restoration efforts. Porous materials could be rendered unsuitable for carbon dating techniques. The probability of such a polluting event occurring and interacting with artifacts is considered low and the potential for significant resource destruction appears small.

13. Irreversible/Irretrievable Commitment of Resources

a. Natural Resources

Mineral Resources: Leasing of tracts included in proposed oil and gas Lease Sale No. 53 would permit development and extraction of the hydrocarbon resources. The U.S. Geological Survey estimates net recoverable reserves (risked mean) of 548 million barrels of oil and 621 billion cubic feet of gas. Leasing of the proposed tracts and subsequent development and extraction could represent an irreversible and irretrievable commitment of these resources.

Land Resources: Industrial development in support of offshore oil extraction, which would occupy coastal lands, could include the following: service bases (permanent or temporary), repair and maintenance yards, general shore support, bases supporting platform and pipeline installation, pipelines and landfalls, partial processing facilities, gas processing and treatment plants, and marine terminals.

The proposed sale would require a minimum of 65-105 acres for each basic support facility. Given the geographical distance between the proposed lease sale areas, it is probable that more than one such complex of facilities would be required. If the finds were sizable enough to warrant the marine terminals, a minimum of 1,095 acres would be necessary. However, given the proximity to available processing facilities, such a large commitment of land is not foreseen.

While usage of lands for facilities such as these may be long-term, they are not generally considered irreversible. However, where new land uses result in the disruption or destruction of natural features or processes, such that return to the previous land use is not possible, an irreversible commitment of resources would occur. An example might be the conversion of a wetland to another use.

Disruption of water supply capabilities through ground water depletion is a irreversible commitment of resources that could occur in many coastal areas (See Section III.A.1.d) unless other supply sources are obtained.

b. Labor Resources: A decision to proceed with proposed Sale No. 53 would result in the production of certain OCS-related goods and services. To the extent that resources would be drawn away from other uses, production of goods and services in other areas or of other types would be foregone. Steel products, specialized manpower, and capital constitute required resources which may be scarce; and use of these resources to develop the central and northern California sale area could mean that other opportunities for their use might have to be foregone. While these resources may be reclaimed over time, their use as a result of this proposed sale, would constitute an irreversible and irretrievable commitment of resources at a given point in time. To the extent that unemployed resources are used, the employment of resources would not constitute a cost to society in the form of foregone opportunities.

Deaths and permanent disabilities from OCS offshore operations are an irretrievable loss of human resources. Between 1970 and 1977, there have been 131 deaths and 197 injuries from such activities. Although they cannot be completely eliminated, deaths and injuries are minimized by continuous updating of OCS safety standards.

14. Relative Gains/Losses of Short-Term Uses to the Long-Term Productivity: The extraction and consumption of mineral resources would preclude their use at a later date and reduce the total reserves in the long term. However, should this proposal result in the discovery of recoverable resources, known reserves could be increased and the area could be opened to additional future sales. If this took place, the activity period would be extended past the year 2006 and, therefore, could be considered as having more long-term effects on the productivity of the offshore and onshore environments. Future sales and extension of OCS related activities in this region could have pronounced long-term effects on many biological communities.

During the exploration and production phases, there will be very limited interference with the longer term uses of the environment, such as commercial fishing and recreation. Temporary impacts to marine communities would result from construction and operation of offshore facilities. Short-term losses would include an anticipated (but unquantifiable) reduction in biological productivity, changes in marine habitats, reduction in populations of plankton, nekton, fish, benthos, birds, mammals, and modification of the food web.

Onshore development and sale related jobs will cause some population increases and shifts. These may cause short-term adverse impacts to communities. Impacts will be greatest if OCS related facilities are located in areas of low population and minimal existing industrial infrastructure. Long-term socio-economic changes are expected to be very slight.

After the completion of oil and gas production, oil spills and their impacts will not occur, and the marine environment is generally expected to remain at or return to its normal long-term productivity levels. It has been recognized that continuous, low-level pollution from toxic chemicals, including oil, may adversely affect long-term productivity. However, to date there has been no discernable decrease in long-term marine productivity in OCS areas where oil and gas has been produced for many years. Until more reliable data becomes available, the long-term effects of the chronic and major spillage of hydrocarbons cannot be accurately projected.

In summary, short-term environmental and socio-economic impacts would result from the proposed Sale. Oil and gas reserves would be lowered. Few long-term productivity or environmental gains are expected as a result of the proposed Sale; the benefits of the Sale are expected to be principally those associated with a medium-term increase in supplies of domestic oil and gas.

15. Net Energy Analysis: The oil and gas industry produces a fuel, but uses energy to do it. Thus, there will be certain resources committed and expended in all the various phases for exploration, construction, development, production, transportation, and refining. In addition, there will be a certain amount which is expended due to processing losses. The energy necessary for finding, producing, transporting, and processing the resources is known as ancillary energy. The part recovered from the total amount of energy in place (reserves) is known as primary efficiency.

The following analysis uses the British thermal unit (Btu) as the common measurement by which both hydrocarbon resources and energy expenditures are evaluated. The most probable risked recoverable energy resources for the proposed Sale are 3.1784×10^{15} Btu's of oil and 6.7937×10^{14} Btu's of gas. This represents a combined total of 3.8578×10^{15} Btu's for the total Sale, or 665 equivalent barrels of oil. (These figures are based on 548 million barrels of oil and 621 billion cubic feet of gas as discussed in Section I.B.2.b). Energy conversion factors are 5.8 million Btu's per barrel of oil and 1,094 Btu's per cubic foot of gas. The following computations detail the net energy gain for oil and gas that would result from the proposed Sale. The analysis used in this Section is based on Fowler, 1975.

The primary efficiency does not apply to exploration and development because the recoverable reserve estimate noted above already includes these factors in the estimate of the resource base. While production has historically been at about 25 percent of the estimated resource base, technological improvements involving better secondary and tertiary recovery methods could improve the level of recoverable resources. While some estimates are that it could reach 70 percent, this factor will not be included here. Instead, primary efficiency of the resource base is assumed at the previously noted 3.1784×10^{15} Btu's of oil. The primary efficiency of transportation is 99 percent, allowing 1 percent for leakage. This brings the net down to 3.1466×10^{15} Btu's. The primary efficiency of refining has been estimated to range from 88 to 96 percent. Taking the mean of 92 percent, the net recovered energy is reduced to 2.8949×10^{15} .

The net energy gain resulting from the Sale requires that this figure be reduced by ancillary requirements. Precise energy factors for exploration, development, and production are not available for the ancillary component. However, they are sufficiently negligible so that an assumption can be made that they would equal no more than 10 percent of the recovered energy. The production inputs would increase significantly if secondary and tertiary recovery methods were employed. Discounting the recovered petroleum based energy reduces the net energy gain to 2.6054×10^{15} Btu's.

It is assumed that pipelines and/or barges are used to ship hydrocarbon

resources to California refineries. The pipeline parameter is 3.59×10^9 Btu's per 10^{12} Btu's piped 300 miles. For barges, the parameter is 25.2×10^9 Btu's per 10^{12} Btu's shipped 1,500 miles. Based on Transportation Scenario No. 1 and the pipelines projected for the proposed Sale (Section I.B.2.c-d), transportation would consume 2.7170×10^{12} Btu's. Therefore, the net energy gain for oil is reduced to 2.6026×10^{15} Btu's resulting from the Sale.

In the case of natural gas, an historic average of 3.4 percent has been lost through venting, flaring, etc., on the OCS. This would reduce natural gas to a net gain of 6.5627×10^{14} Btu's. Additionally, some natural gas is used (about 4 percent) to drive compressors on a gas pipeline. This computes to 2.6251×10^{13} Btu's, reducing the net gas to 6.3002×10^{14} Btu's. Ancillary energy expenditures associated with exploration, development, and production for gas are included in the figure for oil. Therefore, the total net gain for oil and gas from proposed Sale No. 53 is 3.2326×10^{15} . This represents an oil equivalency of 557 million barrels of oil. This net energy gain of 557 million barrels from proposed Sale No. 53 would be reduced by any deletion alternative that might be adopted. The extent of this net energy reduction could be determined by applying the factor relating resources in the alternative relative to total Sale resources.

There is one final factor concerning the analysis of energy expenditures in developing the resource base. OCS development could cause conflicts between multiple-users of the OCS which itself might necessitate additional energy expenditures. This conflict involves vessel traffic and the possibility that shipping might face re-routing and additional transit miles in areas where OCS development is taking place. The Pacific Merchant Shipping Association has estimated that development of the Sale No. 53 area could necessitate re-routing of shipping traffic requiring an estimated increase of 336,800 shipping miles per year. Over the 20-year life of the project, this could result in the additional expenditure of 8.4 million barrels of oil, reducing the total net energy gain from the proposed sale to approximately 546 million barrels of oil.

Thus, there is a substantial net gain in energy that would result from development of tracts included in the proposed Sale. Of course, some tracts or tract groups would be more energy efficient than others. If particular tracts or subareas were energy efficient (i.e., requiring more in energy resources for their development than would be obtainable from the resource base), there would be no economic or energy incentives which would cause leasing and development of those particular tracts or areas.

C. Probable Impacts of Alternatives to the Proposed Action

1. Summary of Impacts for the Alternatives to the Proposed Action: A summary of impacts for the proposed action is discussed in Section II.A.2, while Section B in this chapter more specifically discusses the impacts resulting from the proposal's impact producing agents given under Section IV.A. The following is a summary of impacts that would be reduced or could be eliminated if the associated alternative was adopted under the proposed action. For more discussion of the Alternatives see Section II.B. The reader should note that the adoption of more than one of the 13 Alternatives listed below would cumulatively reduce the impacts for the proposed action.

a. Alternative to Modify the Sale by Deleting the Eel River Basin: If Alternative 1 is selected, impacts resulting from Sale No. 53 will remain the same with the exceptions in the Eel River area discussed below.

The elimination of routine sewage, formation water, drilling mud and cutting discharge will eliminate degradation of water quality from these sources. Lack of onshore and offshore air emissions will result in maintenance of current air quality. Because no structures will be built offshore or onshore, sources of visual and spiritual intrusion will not occur. The lack of offshore and onshore structures and exploration/development activities will eliminate impacts to archaeological resources. The lack of offshore structures and debris will eliminate commercial fishing impacts from related gear losses or space/use conflicts.

This alternative will also eliminate the potential impacts of manmade structures, drill muds, and cuttings on the Petrale and Dover sole spawning grounds and on the hard rock outcrop located in this Basin. Similar impacts on other commercial and sport fisheries in this basin will also be eliminated.

The elimination of exploration and development-related activities will eliminate any potential traffic conflicts on five tracts. Geohazard concern for 19 tracts will be eliminated.

b. Alternative to Modify the Sale by Deleting the Point Arena Basin: If Alternative 2 is selected, impacts resulting from Sale No. 53 will remain the same with the exceptions in the Point Arena discussed below.

The elimination of routine sewage, formation water, drilling mud and cutting discharge will eliminate degradation of water quality from these sources. lack of onshore and offshore air emissions will result in maintenance of current air quality. There will be no oil spills from sources within the Point Arena Basin, thus eliminating potential spill

impacts historic and prehistoric cultural resources, biota gathered by the local Native American population, water quality, estuary/wetlands habitats, recreation, sportfishing, and commercial fishing. Because no structures will be built offshore or onshore, sources of visual and spiritual intrusion will not occur. The lack of offshore structures and debris will eliminate commercial fishing impacts, related gear losses or space/use conflicts. The lack of offshore and onshore structures and exploration/development activities will eliminate impacts to archaeological resources. Geohazard concern for 8 tracts will be eliminated.

c. Alternative to Modify the Sale by Deleting the Bodega Bay Area: If Alternative 3 is selected, impacts resulting from Sale No. 53 will remain the same with the exceptions in the Bodega Bay Area discussed below.

The elimination of routine sewage, formation water, drilling mud and cutting discharge will eliminate degradation of water quality from these sources. Lack of onshore and offshore air emissions will result in maintenance of current air quality.

there will be no oil spill impacts from sources within the Boedga Bay Area thus eliminating potential spill impacts to historic and prehistoric cultural resources, biota gathered by the local Native American population, water quality, estuary/wetlands, habitats, recreation, sportfishing, and commercial fishing, including the Pacific herring, giant Pacific oyster and salmon). Because no structures will be built offshore or onshoe, sources of visual and spiritual intrusion will not occur. The lack of offshore structures and debris will eliminate commercial fishing impacts because there will be no related gear losses of space/use conflicts. The lack of offshore and onshore structures and exploration/development activities will eliminate impacts to archaeological resources. Impacts from the operation of tankers, barges, and supply and crew boats will be eliminated.

d. Alternative to Modify the Sale by Deleting the Santa Cruz Basin: If Alternative 4 is selected, impacts resulting from Sale No 53 will remain the same with the exception in the Santa Cruz Basin discussed below.

The elimination of routine sewage, formation water, drilling mud and cutting discharge will eliminate degradation of water quality from the sources. Lack of onshore and offshore air emissions will result in maintenance of current air quality. There will be no oil spills from sources within the Santa Cruz Basin, thus eliminating potential spill impacts to historic and prehistoric cultural resources, water quality, estuary/wetlands habitats, recreation, sportfishing, and commercial fishing. Because no structures will be built offshore or onshore, sources of visual and spiritual intrusion will not occur. The lact of

offshore and onshore structures and exploration/development activities will eliminate impacts to archaeological resources. The lack of offshore structures and debris will eliminate commercial fishing impacts because there will be no related gear losses or space/use conflicts. The elimination of exploration and development related activities will eliminate any potential traffic conflicts. Geohazard concern for two tracts will be eliminated. Potential conflicts between military operations and tankers, work, and supply boats on two tracts will be eliminated.

e. Alternative to Modify the Sale by Deleting the Santa Maria Basin: If Alternative 5 is selected, impacts resulting from Sale No. 53 will remain the same with the exceptions in the Santa Maria Basin discussed below.

The elimination of routine sewage, formation water, drilling mud and cutting discharge will eliminate degradation of water quality from these sources. Lack of onshore and offshore air emissions will result in maintenance of current air quality.

There will be no oil spills from Sale No. 53 leases within Santa Maria Basin, thus eliminating potential spill impacts to historic and prehistoric cultural resources, biota gathered by the local Native American population, water quality, estuary/wetlands habitats, recreation, sportfishing, and commercial fishing. State parks, the Channel Islands National Park and proposed Santa Barbara Channel marine sanctuary would also benefit from this alternative because oil spills, which could be moved into these areas by seasonal currents would be potentially reduced.

Because no new structures will be built offshore and onshore, sources of visual and spiritual intrusion will not occur. The lack of offshore structures and debris will eliminate commercial fishing impacts from related gear losses or space/use conflicts. Geohazard concern for 35 tracts will be eliminated. Potential conflicts between tankers, work, and supply boats and military operations will be eliminated. Potential conflicts between military operations tankers, work and supply boats on 2 tracts will be eliminated.

State parks, the Channel Islands National Park and proposed Santa Barbara Challen marine sanctuary would also benefit from this alternative because oil spills, which could be moved into these areas by seasonal currents would be potentially reduced.

f. Alternative to Modify the Sale by Creating a 6-Mile Buffer Zone within the Santa Maria Basin to Enhance Sea Otter Protection: The development of a 6-mile buffer zone in the northern tracts of the Santa Marine basin, as discussed in Section II.B.7.a., could be implemented to protect the sea otters. The creation of the

6-mile buffer zone, near Point Buchon, would require the deletion of 6 tracts and the establishment of a stipulation for 10 tracts. The stipulation would not allow drilling within 6 miles of the coast.

The impacts of the proposed action would be the same with the following exception; the impacts to the sea otter and general biota would be reduced, aesthetics would be improved and the possibility of geologic phenomena impacting OCS exploration or development activity would be reduced.

If an oil spill were to occur, as a result of the proposed action, oil could be transported into an area where the sea otters live, ultimately the oil could come in contact with the animal. The sea otter's ability to maintain its body heat would be reduced if the animals insulation ability was reduced by oil adhering to the animals fur. Death could occur if about 20% of the animals body was covered with oil.

The average number of oil spills from the proposed sale expected to strike the sea otter range is low. This alternative would not significantly reduce the number of oil spills expected to hit the sea otter range.

This alternative could reduce the impact to the sea otters by giving an additional amount of time for the containment, clean up dissipation of toxic components, or dispersion and break up of an oil spill traveling toward the sea otter range. Additionally, this alternative will require drilling and development activities to take place further offshore where the north to south California current flow is more prevalent throughout the year. Transport of spilled oil by the California current would mean the oil would be transported south and away from the sea otter range; rather than toward the adjacent coast or up the coast where the oil could enter the sea otter range.

Establishment of this alternative will similarly reduce the impacts to the intertidal organisms, seabirds and marine mammals found along the coast near Point Buckon. The deletion of the 6 tracts through this Alternative will improve water quality by reducing the amount of drill cuttings/muds and other fluids that would be discharged into the marine environment. Also, air emissions will be slightly reduced (depending on unquantifiable resources reduced through tract deletion). Aesthetics will be improved by creating the 6-mile buffer zone, thus requiring all OCS activities to take place at least 6-miles offshore of Point Buchon. The alternative would reduce commercial fisheries offshore space use conflicts; and, as mentioned, reduce the amount of effluent discharge. Additionally the potential for impacts on aboriginal and historic cultural resources located within the buffer zone would be reduced.

g. Alternative to Modify the Sale by Deleting Part of the Eel River Basin to Enhance Protection of Commercial Fisheries: The

impacts to the environment, should this alternative be selected, will remain substantially the same as discussed in Section B of this chapter except for the following impacts.

Although the California shelf is intermediate in productivity, from a worldwide standpoint, the Eel River Basin is one of the most productive fishing grounds. Moiseev (1971) reported the worldwide range in fish productivity was 10 to 3,000 kg/km² with California producing 500-700 kg/km². However, production in parts of the Eel River Basin exceeds 2,500 kg/km² based on data obtained from the California Department of Fish and Game.

Clearly this area is extremely rich, and flatfish (primarily Perrale and Dover sole) represent one of the most important fish groups harvested in the Eel River Basin. In 1975, the most recent year for which there is comprehensive data, 3,900,000 pounds of flatfish worth \$586,000 were caught in this basin. This represents over ten percent of all flatfish caught in California. As noted above, Perrale and Dover sole both have important spawning grounds in this basin.

Discharge of drilling muds and cuttings could deleteriously affect the spawning grounds, spawning behavior, and the survival of eggs, larval and juvenile stages. Manmade structures could cause physical disruption of the spawning grounds. Disruption of these spawning areas could seriously impact the populations and their fisheries. This alternative would eliminate impacts from drilling muds, drill cuttings and manmade structures by eliminating tracts that overlap these spawning areas. Similar spawning areas are not known to occur in any of the other proposed lease tract basins.

The alternative will additionally reduce: 1) roughly half of the impacts to air quality in the Eel River Basin, 2) the potential impacts of disturbance from crew and supply boats to the large populations of harbor seals and birds in Humboldt Bay, 3) the amount of land needed for onshore supplies and facilities thereby reducing potential impacts on terrestrial plants and animals, 4) potential noise impacts to migrations of the endangered gray whale, 5) roughly half of the impacts to other biological communities in the Eel River Basin, 6) roughly half of the impacts to other commercial and sport fisheries in the Eel River Basin, 7) the number of onshore facilities needed thereby reducing impacts to the population and employment of areas near the Eel River Basin, 8) economic impacts in areas adjacent to the Eel River Basin slightly, 9) impacts to proposed traffic lanes through tracts 19 and 20 to serve Humboldt Bay, 10) potential impacts to cultural resources, particularly shipwrecks, 11) the possibility of geologic phenomena impacting OCS exploration or development activities in a large number of the tracts that have mass movement, submarine canyons or channels, and known active faults.

These reductions in impacts would occur because the alternative would be expected to reduce the number of manmade structure, the amount of effluents and discharges, and the amount of vessel traffic in the Eel River Basin by about 50 percent.

h. Alternative to Modify the Sale by Deleting Tracts to Enhance Protection of Sensitive Biological Areas: The impacts to the environment should this alternative be selected will remain substantially the same as described in the impact Section IV except for impacts on marine life. The impact to marine life in the Eel River Basin would be reduced because tracts located in a hard bottom area with reefs which are habitats for many species of invertebrates and fish would not be affected by the discharge of formation water, drilling fluids and cuttings, the physical disturbance by placement of rigs/platforms and anchoring structures, and reduction in potential oil spill impacts. The Eel River Basin contains several confirmed rocky bottom habitats which represent highly sensitive biological areas. This alternative would reduce the impact to the abalone, which are heavily harvested in this area, as identified by California Fish and Game, intertidal invertebrates, and two seabird rookeries on Devil's Basin Rock and White Rock in the Point Arena Basin by providing an increased buffer zone in which to respond to accidental spills, by reducing OCS related noise on the rookeries, and by reducing possible pollutant effects on the abalone from effluent discharges. The alternative would delete tracts proximal to Bean Hollow and James V. Fitzgerald Marine Reserve in the Santa Cruz Basin, thereby reducing impacts to extremely rich intertidal areas by providing a buffer zone to allow more adequate oil spill response time and to allow further dilution of potential pollutants from other tracts. The Fitzgerald shoreline is an Area of Special Biological Significance (ASBS) with a highly productive rocky intertidal zone. The Bean Hollow shoreline supports a rocky intertidal zone which appears to be even more highly developed than the Fitzgerald ASBS. Considering the small number of tracts in this alternative, the overall change in impacts to the general lease sale area is negligible.

i. Alternative to Modify the Sale by Deleting Tracts Adjacent to Proposed Marine Sanctuary Areas: The impacts to the entire OCS environment involved in lease Sale 53 will remain substantially as described in the impacts Section IV if this alternative is selected. The exceptions are marine life and water quality.

1). The deletion of the two tracts which lie partially within the proposed Point Reyes/Farallon Islands Marine Sanctuary would slightly reduce impacts on marine life such as intertidal organisms, seabirds and marine mammals; by reducing the amounts of drilling fluids, formation water and hydrocarbons from spills which might reach the sanctuary areas. Noise which might affect marine mammals and seabirds would also be slightly reduced. Considering the small number of tracts being deleted and the current pattern in the area

the above reductions would only be minimal.

2). Deletion of the seven tracts near the proposed Monterey Bay and adjacent Waters Marine Sanctuary would create a buffer zone that could slightly reduce impacts on marine life by reducing the amounts of drilling fluids, formation water and hydrocarbons from spills that may reach the sanctuary areas. Noise which might affect marine mammals and seabirds would also be slightly reduced. Water quality in Monterey Bay and harbor could be moderately affected by reducing these nearshore lease tracts because these are the tracts from which nearshore currents are most likely to transport pollutants.

Again, given the small number of tracts in this alternative, the overall lease Sale 53 impacts will not be significantly altered under this alternative.

j. Alternative to Modify the Sale to Reduce Potential Geohazard Conflicts: The impacts to the environment, should this Alternative be selected, will remain the same as described in Section B of this chapter except for the following impacts.

This alternative would reduce the possibility of geologic phenomena impacting OCS exploration or development activities by deleting tracts which are characterized by mass movement (sediment instability, slumps, slides), submarine canyons or channels, and known active faults. (See Figure II.B.11.a-1,2).

The deletion of the tracts identified under the geohazard alternative would reduce the possibility of an oil spill generated by pipeline rupture, platform collapse or well disruption as well as reduce the potential for loss of life and/or equipment due to fault motion, seismic ground shaking, or seafloor instability associated with the geologic features identified above.

The following is a discussion of how impacts discussed in Section IV.B will be reduced for the following resource categories if this alternation is implemented.

Removal of tracts in the Eel River Basin will protect the Petrale and Dover sole spawning areas as well as an extensive hard rock outcrop which forms an important habitat for many fish and benthic species. Removal of tracts in Pt. Arena, Santa Cruz and Santa Maria Basins will generally reduce potential impacts to fisheries in these areas as well. In particular, impact will be reduced due to a reduction in man-made structures (which could disrupt spawning grounds and cause offshore space use conflicts) and a reduction of the likelihood of an oil spill.

The potential for discharge of pollutants into the atmosphere will be reduced by an amount proportional to the number of tracts or resources

deleted in this alternative and hence reduce the potential air quality impacts cited in Section IV.B.

The potential for water quality degradation due to oil spills, and discharge of drilling muds and other fluids will be reduced by an amount proportional to the amount of tracts or resources deleted within this option. Especially affected would be the quality of water in Humboldt, Morro Bays and the Santa Barbara Channel.

Impacts discussed in Section IV.B will be reduced with tracts deleted in Santa Maria creating a buffer zone to the Pt. Buchon proposed underwater park and the Dinosaur Caves (considered) underwater park. Deletions in this alternative will also reduce impacts to beach areas in the highly utilized Santa Maria area (e.g., Pismo Beach), Channel Islands National Park, as well as reduce the impact to visual aesthetics in the Pt. Arena area.

Removal of tracts in the Santa Maria area will reduce the possibility of an oil spill impacting the southern portion of the sea otter range. Removal of tracts in Santa Cruz reduce the possibility of impacts on the northern sea otter range and Ano Nuevo Island, an important pinniped and seabird area. Also deletion of tracts in the Point Arena area would reduce potential impacts by oil spillage on pinnipeds and seabirds commonly found there along the coast.

Tract deletions in alternative II.B.11 would assist in reducing potential impacts to historically important shipwrecks and potentially sensitive zones for aboriginal remains, particularly those tracts located in the nearer-shore portions of the deletion alternative.

Deletion of tracts 19, 20, 21, and 131 for geohazards would serve to reduce impacts to the Sale No. 53 proposed traffic lanes serving Humboldt and Estero Bays.

Removal of tracts identified in alternative 11 would reduce impacts from drill cuttings and mud discharge in these areas, which tend to bury soft and hard bottom benthic communities. Additionally, the potential for impacts on local communities of phytoplankton, zooplankton and kelp would be decreased. Further, impacts on Pismo Beach clam area, Nipomo Dunes and wetlands, Diablo Canyon intertidal area (all Santa Maria region) would be reduced. Environments such as estuaries and unusual or productive rocky intertidal areas identified in Visual No. 5 and Tables III.A.2.B.i-1, -2 will also have a reduced potential for impact from OCS activities.

Impacts that would result if the geohazard alternative were adopted, are similar to those resulting from the total sale proposal. Although the resource base would be substantially reduced, the tracts to be deleted within this alternative are sufficiently scattered over the sale area,

that it is likely that the same number of temporary and permanent onshore support bases would be required. Because the level of socio-economic impacts are closely related to the employment and economic activity associated with these facilities, it is likely that the over all socio-economic impacts would be similar to those impacts that would be generated from the sale proposal.

k. No Sale Alternative: The No-Sale alternative would eliminate environmental impacts associated with Sale No. 53 oil and gas activities in the proposed sale area. (See Section IV.B.) The area would continue in its present condition as further modified by natural processes and the continuation of all existing offshore and onshore activities and uses.

This alternative should also be viewed within the overall context of oil and gas development in the nation. The no sale alternative has direct impact and implications for the Department of Energy's oil and gas reserves identified for the Pacific OCS region. The no sale alternative would result in less leasing activity than required by the proposed 5-year OCS schedule. In the short-run there would be a likely increase in crude oil imports. The tankering of imported oil would likely increase the oil spill risk to the nation as compared with the general pipeline transport of OCS production. It could also cause a marginal decrease in employment and income with an ultimate loss in personal income, government revenues, and some financing of community services that would be made possible by the proposal.

l. Delay the Sale Alternative: The impacts of a Delay the Sale Alternative would largely be the same as described in IV.B. of the Final EIS, but they would occur later on in time. If delay were for the purpose of awaiting new information, it is presumable that such information could result in improved environmental controls which might marginally lessen the environmental impacts. However, the scope of the possible information, its importance, and what controls might be devised are presently unknown and can only be speculated. Additionally, the delay alternative could allow for the development of improved technology, increased recovery capability, and safer oil and gas operations, thus providing more resource recovery with reduced risk to the environment. The marginal difference in impacts between this alternative and the proposed action is unknown.

Other aspects of delaying the Sale are similar to those noted in the previous Section IV.C.2. These impacts relate to increased crude oil imports as a result of the delay period, increased tankering of foreign oil resulting in additional oil spill risk to the nation as compared with the general pipeline transport of OCS production, and decreased employment and income prospects from what would be generated by oil and

gas development. Development of OCS resources at a date further into the future could also, however, result in greater environmental impact to resource categories discussed in Section IV.B if multiple uses of the coastal and marine environments increase. The period of delay would be the determining factor as to the extent of all impacts. If the sale were reinstated, however, the impacts could occur as indicated in Section IV.B.

2. Summary of Subregional Impacts: Impacts from the proposed Sale No. 53 and Alternatives have been discussed in Sections II.A.2, II.B.1.b, II.B.2.b and IV.B. The tables in this section summarize the probable impacts to the environment, for each oil and gas basin proposed under this sale.

TABLE IV.C.2-1

SUMMARY OF PROBABLE IMPACTS TO THE ENVIRONMENT (EEL RIVER)

Ecosystem Component	Impact Producing Agent and Type of Loss	Estimated Loss Over Life of Field
I. Air and Water	1. Oil Spills Degradation of water quality	None (no oil)
	2. Acute and Chronic Discharges Degradation of water quality	Minor impacts are expected as a result of routine sewage, formation water, and drilling mud and cutting discharge.
	3. Onshore and offshore emissions Degradation of air quality	
II. Marine and Coastal Ecosystems	1. Oil Spills	
	a. Destruction or degradation of vulnerable habitats	a. Minor
	b. Decline of vulnerable species	b. Minor
	2. Disturbance and Noise Change in behavior of vulnerable species	Minor
	3. Offshore Structures	
III. Socio-Economic System	a. Loss of habitat	
	b. Establishment of new habitats	b. Minor, positive effects
	1. Changes in Economic Activity	
	a. Welfare losses due to social infrastructure stress	a. Minor - Slight increased demand for public services
	b. Welfare losses due to social stress	b. Negligible
IV. Recreation and Sportfishing	1. Oil Spills	
	a. Loss of beach/ocean recreation opportunities	a. None (no oil)
	b. Loss of sportfishing catch due to possibility of damaged gear, closure, tainting, and population declines.	b. None (no oil)
	c. Economic loss to recreation industry and regional economy	c. None (no oil)
	2. Manmade Structures	
	a. Welfare loss to recreationists due to degraded quality of activity	a. Minor, short-term loss due pipeline installation. Visual intrusion of platforms
	b. Loss of sportfishing catch due to space-use conflicts	b. None.

TABLE IV.C.2-1 EEL RIVER (Continued)

Ecosystem Component	Impact Producing Agent and Type of Loss	Estimated Loss Over Life of Field
V. Commercial Fisheries	1. Oil Spills Loss of catch due to damaged gear closure, tainting, mortality and population declines	None (no oil)
	2. Manmade Structures	
	a. Loss of nets and fishing time	a. Over \$10,000
	b. Loss of critical habitats	b. Indeterminable
	c. Loss of onshore facilities	c. Indeterminable
	3. Discharge and Effluents Population declines	Indeterminable
	4. Vessel Traffic Loss of fishing area, gear and catch	Indeterminable
VI. Shipping, Ports, Navigation, and Military Use	1. Tankers, Barges, Supply and Crew Boats	
	a. Accidents	a. None
	b. Conflict with military operation	b. None
	2. Traffic Lane Higher exploration and development cost	Five tracts
VII. Archaeological and Cultural Resources	1. Oil Spills	
	a. Welfare losses due to damage or destruction of cultural resources.	a. Damage to and destruction of marine and terrestrial archaeological sites. Decrease in quality of historic sites.
	b. Decrease in biota used ceremonially by Native Americans.	b. Spiritual impact on Native American community.
	2. OCS Related Structures	
	a. Welfare losses due to damage or destruction of cultural resources.	a. Damage to and destruction of marine and terrestrial archaeological sites. Decrease in quality of historic sites.
	b. Spiritual intrusion: (Native Americans).	b. Spiritual impact on Native American community.

TABLE IV.C. 2-2

SUMMARY OF PROBABLE IMPACTS TO THE ENVIRONMENT (POINT ARENA)

Ecosystem Component	Impact Producing Agent and Type of Loss	Estimated Loss Over Life of Field
I. Air and Water	1. Oil Spills Degradation of water quality	Short-term near field sea water quality reduction expected. Long-term impact in ocean unknown.
	2. Acute and Chronic Discharges Degradation of water quality	Minor impacts are expected as a result of routine sewage, formation water, and drilling mud and cutting discharge.
	3. Onshore and offshore emissions Degradation of air quality	
II. Marine and Coastal Ecosystems	1. Oil Spills	
	a. Destruction or degradation of vulnerable habitats	a. Minor, short-term, unless the estimated 1.65 spills occur back to back or enters a major wetland area then impact would be expected to be moderate to severe and of a longer term.
	b. Decline of vulnerable species	b. Estuaries and other wetlands may be places where if hit by a spill, populations may not recover.
	2. Disturbance and Noise Change in behavior of vulnerable species	None expected
	3. Offshore Structures	
	a. Loss of habitat	a. Insignificant loss of habitat.
	b. Establishment of new habitat	b. Minor position effects.

TABLE IV.C. 2-2 (Continued)

POINT ARENA

Ecosystem Component	Impact Producing Agent and Type of Loss	Estimated Loss Over Life of Field
III. Socio-Economic Systems	1. Changes in Economic Activity <ul style="list-style-type: none"> a. Welfare losses due to social infrastructure stress b. Welfare losses due to social stress 	<ul style="list-style-type: none"> a. Negligible - very little increased demand for public services. b. Negligible
IV. Recreation and Sportfishing	1. Oil Spills <ul style="list-style-type: none"> a. Loss of beach/ocean recreation opportunities b. Loss of sportfishing catch due to possibility of damaged gear, closure, tainting, and population declines. c. Economic loss to recreation industry and regional economy 	<ul style="list-style-type: none"> a. Minor unless estimated 0.9 spill has direct contact with shore b. Negligible c. Possible major loss to local area, minor loss to sale area
	2. Manmade Structures <ul style="list-style-type: none"> a. Welfare loss to recreationists due to degraded quality of activity b. Loss of sportfishing catch due to space-use conflicts 	<ul style="list-style-type: none"> a. Minor, short-term loss due pipeline. Visual intrusions of platforms b. None.
V. Commercial Fisheries	1. Oil Spills <ul style="list-style-type: none"> Loss of catch due to possibility of damaged gear, closure, tainting, and population declines 	<p>Over \$113,000 for salmon fishery. Indeterminable for other fisheries but low, moderate and high ecological losses could occur. Indeterminable for support, processing, transportation and marketing industries.</p>
	2. Manmade Structures <ul style="list-style-type: none"> a. Loss of nets and fishing time b. Loss of critical habitats c. Loss of onshore facilities 	<ul style="list-style-type: none"> a. Over \$60,000 b. Indeterminable c. Indeterminable
	3. Discharge and Effluents <ul style="list-style-type: none"> Population declines 	Indeterminable
	4. Vessel Traffic <ul style="list-style-type: none"> Loss of fishing area, gear and catch 	Indeterminable
VI. Shipping, Ports, Navigation, and Military Use	1. Tankers, Barges, Supply and Crew Boats <ul style="list-style-type: none"> a. Accidents b. Economic Gains - wages direct and secondary c. Conflict with military operation 	<ul style="list-style-type: none"> a. 0.28 vessel accidents b. \$35,000,000 c. None
	2. Traffic Lane <ul style="list-style-type: none"> Higher exploration and development cost 	None
VII. Archaeological and Cultural Resources	1. Oil Spills <ul style="list-style-type: none"> a. Welfare losses due to damage or destruction of cultural resources 	<ul style="list-style-type: none"> a. Damage to and destruction of marine and terrestrial archaeological sites. Decrease in quality of historic sites. Decrease subsistence resource of Native American. b. Decrease of subsistence resource base (Native American)
	2. OCS Related Structures <ul style="list-style-type: none"> a. Welfare losses due to damage or destruction of cultural resources b. Visual and auditory intrusion c. Spiritual intrusion (Chinese) 	<ul style="list-style-type: none"> a. Damage to and destruction of marine and terrestrial archaeological sites. Decrease in quality of historic sites. b. Decrease in quality of historic sites c. Spiritual impact on local Chinese.

TABLE IV.C 2-3

SUMMARY OF PROBABLE IMPACTS TO THE ENVIRONMENT (BODEGA BAY)

Ecosystem Component	Impact Producing Agent and Type of Loss	Estimated Loss Over Life of Field
I. Air and Water	1. Oil Spills Degradation of water quality	Short-term near field sea water quality reduction expected. Long-term impact in ocean unknown.
	2. Acute and Chronic Discharges Degradation of water quality	Minor impacts are expected as a result of routine sewage, formation water, and drilling mud and cutting discharge.
	3. Onshore and offshore emissions Degradation of air quality	
II. Marine and Coastal Ecosystems	1. Oil Spills	
	a. Destruction or degradation of vulnerable habitats	a. Minor, short-term, unless the estimated 1.65 spills occur back to back or enters a major wetland area then impact would be expected to be moderate to severe and of a longer term.
	b. Decline of vulnerable species	b. Estuaries and other wetlands may be places where if hit by a spill populations may not recover.
	2. Disturbance and Noise Change in behavior of vulnerable species	None expected.
	3. Offshore Structure	
	a. Loss of habitat	a. Insignificant loss of habitat.
	b. Establishment of new habitat	b. Minor positive effects.

TABLE IV.C.2-3 (Continued)

BODEGA BAY

Ecosystem Component	Impact Producing Agent and Type of Loss	Estimated Loss Over Life of Field
III. Socio-Economic Systems	1. Changes in Economic Activity a. Welfare losses due to social infrastructure stress b. Welfare losses due to social stress	a. Negligible - very little increased demand for public services. b. Negligible
IV. Recreation and Sportfishing	1. Oil Spills a. Loss of beach/ocean recreation opportunities b. Loss of sportfishing catch due to possibility of damaged gear, closure, tainting, and population declines. c. Economic loss to recreation industry and regional economy 2. Manmade Structures a. Welfare loss to recreationists due to degraded quality of activity b. Loss of sportfishing catch due to space-use conflicts	a. Minor unless estimated 0.9 spill has direct contact with shore b. Negligible c. Possible major loss to local area, minor loss to sale area a. Minor, short-term loss due pipeline. Visual intrusions of platforms b. None.
V. Commercial Fisheries	1. Oil Spills Loss of catch due to possibility of damaged gear, closure, tainting, and population declines 2. Manmade Structures a. Loss of nets and fishing time b. Loss of critical habitats c. Loss of onshore facilities 3. Discharge and Effluents Population declines 4. Vessel Traffic Loss of fishing area, gear and catch	Over \$61,000 for salmon fishery. Indeterminable for other fisheries but low, moderate and high ecological losses could occur. Indeterminable for support, processing, transportation and marketing industries. a. Over \$60,000 b. Indeterminable c. Indeterminable Indeterminable Indeterminable
VI. Shipping, Ports, Navigation, and Military Use	1. Tankers, Barges, Supply and Crew Boats a. Accidents b. Economic Gains - wages direct and secondary c. Conflict with military operation 2. Traffic Lane Higher exploration and development cost	a. 0.44 vessel accidents b. \$15,000,000 c. Five tracts None
VII. Archaeological and Cultural Resources	1. Oil Spills a. Welfare losses due to damage or destruction of cultural resources 2. OCS Related Structures Welfare losses due to damage or destruction of cultural resources	a. Damage to and destruction of marine and terrestrial archaeological sites. Damage to and destruction of marine and terrestrial archaeological sites.

TABLE IV.C. 2-4

SUMMARY OF PROBABLE IMPACTS TO THE ENVIRONMENT (SANTA CRUZ)

Ecosystem Component	Impact Producing Agent and Type of Loss	Estimated Loss Over Life of Field ^a
I. Air and Water	1. Oil Spills Degradation of water quality	Short-term near field sea water quality reduction expected. Long-term impact in ocean unknown.
	2. Acute and Chronic Discharges Degradation of water quality	Minor impacts are expected as a result of routine sewage, formation water, and drilling mud and cutting discharge.
	3. Onshore and Offshore Emissions Degradation of air quality	
II. Marine and Coastal Ecosystems	1. Oil Spills	
	a. Destruction or degradation of vulnerable habitats	a. Minor, short-term, unless the estimated 1.65 spills occur back to back or enters a major wetland area then impact would be expected to be moderate to severe and of a longer term.
	b. Decline of vulnerable species to nonrecoverable	b. Estuaries and other wetlands may be places where if hit by a spill, populations may not recover.
		c. If Sea Otter Range hit by spill, Sea Otters, their habitat, and their food could be impacted so as to severely restrict recovery.
	2. Disturbance and Noise Change in behavior of vulnerable species	None expected
	3. Offshore Structures Loss of habitat	Insignificant loss of habitat.

TABLE IV.C.2-4 (Continued)

SANTA CRUZ

Ecosystem Component	Impact Producing Agent and Type of Loss	Estimated Loss Over Life of Field
III. Socio-Economic Systems	1. Changes in Economic Activity a. Welfare losses due to social infrastructure stress b. Welfare losses due to social stress	a. Negligible - very little increased demand for public services. b. Negligible
IV. Recreation and Sportfishing	1. Oil Spills a. Loss of beach/ocean recreation opportunities b. Loss of sportfishing catch due to possibility of damaged gear, closure, tainting, and population declines. c. Economic loss to recreation industry and regional economy 2. Manmade Structures a. Welfare loss to recreationists due to degraded quality of activity b. Loss of sportfishing catch due to space-use conflicts	a. Minor unless estimated 0.9 spill has direct contact with shore b. Negligible c. Possible major loss to local area, minor loss to sale area a. Minor, short-term loss due pipeline. Visual intrusions of platforms b. None.
V. Commercial Fisheries	1. Oil Spills Loss of catch due to possibility of damaged gear, closure, tainting, and population declines 2. Manmade Structures a. Loss of nets and fishing time b. Loss of critical habitats c. Loss of onshore facilities 3. Discharge and Effluents Population declines 4. Vessel Traffic Loss of fishing area, gear and catch	Over \$585,000 for salmon fishery. Indeterminable for other fisheries but low, moderate and high ecological losses could occur. Indeterminable for support, processing, transportation and marketing industries. a. Over \$30,000 b. Indeterminable c. Indeterminable Indeterminable Indeterminable
VI. Shipping, Ports, Navigation, and Military Use	1. Tankers, Barges, Supply and Crew Boats a. Accidents b. Economic Gains - wages direct and secondary c. Conflict with military operation 2. Traffic Lane Higher exploration and development cost	a. None b. \$2,300,000 c. Two tracts None
VII. Archaeological and Cultural Resources	1. Oil Spills Welfare losses due to damage or destruction of cultural resources 2. OCS Related Structures a. Welfare losses due to damage or destruction of cultural resources b. Visual and auditory intrusion	Damage to and destruction of marine and terrestrial archaeological sites. Damage to and destruction of marine and terrestrial archaeological sites. These losses could be caused by agent. 1, 2a and 2b.

TABLE IV.C. 2-5

SUMMARY OF PROBABLE IMPACTS TO THE ENVIRONMENT (SANTA MARIA)

Ecosystem Component	Impact Producing Agent and Type of Loss	Estimated Loss Over Life of Field ^a
I. Air and Water	1. Oil Spills Degradation of water quality	Short-term near field sea water quality reduction expected. Long-term impact in ocean unknown.
	2. Acute and Chronic Discharges Degradation of water quality	Minor impacts are expected as a result of routine sewage, formation water, and drilling mud and cutting discharge.
	3. Onshore and Offshore Emissions Degradation of air quality	
II. Marine and Coastal Ecosystems	1. Oil Spills	
	a. Destruction or degradation of vulnerable habitats	a. Minor, short-term unless the estimated 1.65 spills occur back to back or enters a major wetland area then impact would be expected to be moderate to severe and of a longer term.
	b. Decline of vulnerable species to nonrecoverable	b. Estuaries and other wetlands may be places where if hit by a spill, populations may not recover.
		c. If Sea Otter Range hit by spill, Sea Otters, their habitat, and their food could be impacted so severely as to restrict recovery.
	2. Disturbance and Noise Change in behavior of vulnerable species	None expected
	3. Offshore Structures Loss of habitat	Insignificant loss of habitat

TABLE IV.C. 2-5 (Continued)

SANTA MARIA

Ecosystem Component	Impact Producing Agent and Type of Loss	Estimated Loss Over Life of Field
III. Socio-Economic Systems	1. Changes in Economic Activity <ul style="list-style-type: none"> a. Welfare losses due to social infrastructure stress b. Welfare losses due to social stress 	<ul style="list-style-type: none"> a. Negligible - very little increased demand for public services. b. Negligible
IV. Recreation and Sportfishing direct	1. Oil Spills <ul style="list-style-type: none"> a. Loss of beach/ocean recreation opportunities b. Loss of sportfishing catch due to possibility of damaged gear, closure, tainting, and population declines. c. Economic loss to recreation industry and regional economy 	<ul style="list-style-type: none"> a. Minor unless estimated 0.9 spill has contact with shore b. Negligible c. Possible major loss to local area, minor loss to sale area
	2. Manmade Structures <ul style="list-style-type: none"> a. Welfare loss to recreationists due to degraded quality of activity b. Loss of sportfishing catch due to space-use conflicts 	<ul style="list-style-type: none"> a. Minor, short-term loss due pipeline. Visual intrusions of platforms b. None.
V. Commercial Fisheries	1. Oil Spills <ul style="list-style-type: none"> Loss of catch due to possibility of damaged gear, closure, tainting, and population declines 	<ul style="list-style-type: none"> Over \$292,000 for salmon fishery. Indeterminable for other fisheries but low, moderate and high ecological losses could occur. Indeterminable for support, processing, transportation and marketing industries.
	2. Manmade Structures <ul style="list-style-type: none"> a. Loss of nets and fishing time b. Loss of critical habitats c. Loss of onshore facilities 	<ul style="list-style-type: none"> a. Over \$50,000 b. Indeterminable c. Indeterminable
	3. Discharge and Effluents <ul style="list-style-type: none"> Population declines 	Indeterminable
	4. Vessel Traffic <ul style="list-style-type: none"> Loss of fishing area, gear and catch 	Indeterminable
VI. Shipping, Ports, Navigation, and Military Use	1. Tankers, Barges, Supply and Crew Boats <ul style="list-style-type: none"> a. Accidents b. Economic Gains - wages direct and secondary c. Conflict with military operation 	<ul style="list-style-type: none"> a. None b. \$3,500,000 c. Six tracts
	2. Traffic Lane <ul style="list-style-type: none"> Higher exploration and development cost 	None
VII. Archaeological and Cultural Resources	1. Oil Spills <ul style="list-style-type: none"> a. Welfare losses due to damage or destruction of cultural resources b. Decrease in biota used ceremoniously by Native Americans c. Spiritual intrusion (Native American) 	<ul style="list-style-type: none"> a. Damage to and destruction of marine and terrestrial archaeological sites. b. Decrease in quality of environmental setting of historic sites c. Spiritual impact on Native American community
	2. OCS Related Structures <ul style="list-style-type: none"> a. Welfare losses due to damage or destruction of cultural resources b. Visual/auditory intrusion 	<ul style="list-style-type: none"> a. Damage to and destruction of marine and terrestrial archaeological sites. b. Decrease in quality of environmental setting of historic sites

CHAPTER V

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CHAPTER VI

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CHAPTER VII

CONSULTATION AND COORDINATION

A. Preparation of the DEIS

1. General Consultation: Prior to and during preparation of the DEIS for proposed OCS Sale No. 53, substantial coordination was conducted with Federal, State, and local government agencies, environmental groups, industry, and individual citizens. This coordination was carried out pursuant to the NEPA implementation regulations which require "an early and open process for determining the scope of issues to be addressed and for significant issues related to the proposed action." The issues and impacts raised during this scoping process are discussed in Section I.B.1.e.

a. Consultation with Federal, State, and local Agencies and Others

Federal Agencies

Department of the Air Force
Department of the Navy
Department of Commerce
Department of Transportation
EPA
Fish and Wildlife Service
Geological Survey
National Marine Fisheries Service

Consultation with these agencies included soliciting input to the draft EIS regarding descriptive information of the proposed sale area, areas of potential impacts or conflicts, and means to effectively mitigate adverse impacts.

The Department of the Interior's Secretarial Order 2974 requires coordination between Interior Department Agencies. Formal coordination on development of lease sale stipulations for the DEIS were initiated among BLM, U.S. Geological Survey, National Park Service and the Fish and Wildlife Service. As a result of this process, stipulations were developed to mitigate impacts on cultural resources, fisheries, biological resources, and to prevent impacts due to geological faulting. Proposed stipulations were included in the PDEIS which was mailed to State and local governments. No comments regarding these stipulations were received from the State of California or local governments.

b. Consultation with State and Local Agencies and Other Interests

The following State and local government agencies were contacted during preparation of the Preliminary Draft and the Draft:

Association Monterey Bay Area Governments
 California Air Resources Board
 California Coastal Commission
 California Coastal Conservancy
 California Dept. of Fish and Game
 California Division of Mines and Geology
 California Lands Commission
 California Office of Planning and Research
 California Parks and Recreation
 California Water Resources Control Board
 City of Grover
 City of Morro Bay
 Humboldt County
 Marin County
 Mendocino County
 Monterey County
 Santa Barbara County
 Santa Cruz County
 San Luis Obispo County
 San Mateo County
 Sonoma County
 Oregon Dept. of Land Conservation and Development

Private Companies, Professional Organization, and Universities

Audubon Society
 California Polytechnical State University
 Chevron
 Clean Air Coalition
 Friends of the Coast
 Friends of the Earth
 Friends of the Sea Otter
 Hopkins Marine Station
 Humboldt State University
 NOIL
 Oceanic Society
 Peninsula Conservation Center
 San Francisco Bay Cons. and Deve. Comm.
 Sea Sciences Services
 Sierra Club
 Stanford University
 UCLA, Berkeley
 Washington State University
 Whale Center
 WOGA

c. Public Scoping Meetings. The Pacific OCS Office conducted public scoping meetings on January 17-26, 1980, at Redwood City, San Luis Obispo, Ft. Bragg, Santa Cruz, Eureka, Santa Rosa. The purpose of these meetings was to obtain information and opinions from potentially

affected members of the public regarding issues and alternatives to be considered in the environmental impact statement for this proposal. A discussion of the results of these meetings is included in Section I.B.1.e.

2. Consultation Pursuant to Section 7 of the Endangered Species Act: As required by Section 7 of the Endangered Species Act of 1973 and its 1978 and 1979 amendments, BLM and USGS have consulted with the Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) to determine what, if any, impact they believe proposed Sale No. 53 could have on threatened and endangered species. The biological opinions provided by FWS and NMFS have not been received by BLM to date, and thus are not included in the final EIS. These opinions will be made available to the Secretary of the Interior before the final sale decision is made.

3. Consultation with State Historic Preservation Office: Extensive consultation was conducted with the California Office of Historic Preservation (OHP) and the Native American Heritage Commission (NAHC) prior to and throughout the preparation of the EIS. This consultation occurred in person, by telephone and by mail. OHP consultation dates included 3-6-79, 4-16-79, 4-17-79, 5-22-79, 12-18-79 and 7-3-80. NAHC consultation dates included 3-7-79, 3-28-79, 4-18-79, 4-24-80, 5-15-80, 7-1-80. In addition to personal visits and fieldwork, dates of consultation with the Native American community included 4-25-79, 4-27-79, 6-17-80 and 6-19-80. Consultation with the California State Lands Commission included contacts on 4-25-79, 5-1-79 and 5-18-79. Consultation with the Advisory Council on Historic Preservation included 6-20-80 and 6-24-80.

B. Public Review of the Draft EIS and Preparation of the Final EIS

1. Public Hearings: The Draft EIS was released to the public on April 18, 1980. At this time, comments were solicited from all interested parties and public hearings on the DEIS were scheduled to provide the public an opportunity to express their views and provide further information on the proposal.

Public hearings were held in the following locations on the dates indicated:

<u>Location</u>	<u>Date</u>	<u>No. of People Testifying</u>
Santa Rosa	June 16-17, 1980	160
Eureka	June 20, 1980	59
Fort Bragg	June 18, 1980	144
San Francisco	June 23-24, 1980	120
Santa Cruz	June 25, 1980	152
San Luis Obispo	June 29, 1980	110

A total of 745 people presented oral testimony at the public hearings, and written testimony was received from a number of these people as well as from others who were unable to attend the hearings. Those testifying at the hearings and presenting written testimony included representatives of State and local governmental agencies, environmental groups, oil industry

associations, Fisheries interests, universities, as well as many individuals testifying on their own behalf. The transcripts of the public hearings and written comments are available for public inspection in the BLM's Pacific OCS Office in Los Angeles, but are not printed as part of the FEIS due to the extremely large volume of comments.

A wide range of issues were raised in public hearing oral and written testimony. Many people submitted specific criticisms of various aspects of the DEIS, a number of people supplied useful information which has been used to improve the environmental analysis in the FEIS, and many people expressed concern about potential adverse impacts of the proposal in general terms.

Among those concerns raised in the public hearings are the following:

- not enough information is available to adequately analyze potential impacts from the proposal; therefore, the sale should be delayed pending availability of more complete information
- not enough consideration has been given to the development of alternative energy sources
- analysis in the DEIS is not site-specific enough
- other alternatives should be considered to mitigate potential impacts
- the expected level of oil and gas resources does not warrant the risk to a number of environmental values including air quality, fisheries, marine mammals and seabirds, recreational beaches, etc.

All public hearing comments, oral and written, have been examined and given thorough consideration during preparation of the FEIS. The summaries of issues and responses to those issues which follow have taken into account the oral and written public hearing testimony.

2. Other Comments on the DEIS: In addition to holding public hearings on the DEIS, the DEIS was submitted to Federal and State agencies and made available to all other interested parties and comments were solicited. Review comments were received from numerous Federal agencies, State of California agencies, county and local governments, environmental groups, organizations, companies and individuals. These comments, most of which offered very specific criticisms and/or provided useful information, were considered in detail during preparation of the FEIS.

3. Issues and Responses: This section summarizes the issues raised in public review of the DEIS. Comments, opinions, and information received through the public hearings (written and oral) and through review of the DEIS (as described in sections 1 and 2 above) were taken into account in the summaries of issues that follow. An attempt has been made, due to

the large volume of comments received, to focus the summaries on the major issues raised and to accurately reflect the range of comments received on each particular issue. Following the summary of each issue is a partial list of commentators who contributed comments on that issue. This is not an exhaustive listing of everyone who addressed that issue but does represent an attempt to identify those who contributed specific substantive criticisms or information.

Following the summary of each issue and list of commentators is a response to each issue. These responses are of various types. They will be either direct responses to the issue raised, indicate what revisions, if any, were made in the FEIS as a result of the comment, or will indicate why a revision of the FEIS was not considered necessary. Some revisions in response to a given comment may have been incorporated into the EIS without being noted within the summary of responses.

Many comments of a strictly technical or editorial nature were received. These comments were given thorough consideration and changes were made in the text of the FEIS as appropriate. However, constraints on time and space preclude the listing of these comments and resulting revisions in the FEIS.

A listing of persons, agencies or organizations who have submitted written comments are also included in the latter portion of this section. Those written comments received from Federal, State and local agencies are reproduced in their entirety (with the exception of a voluminous contribution from the State of California, which appears in abbreviated form) at the end of this Chapter.

Issue #1: Alternatives and Mitigating Measures to be Analyzed in the FEIS

Many of the comments received recommended that additional alternatives and mitigating measures (primarily lease stipulations) should be presented and analyzed in the Environmental Impact Statement. It was felt by many commentators that deletion of each basin proposed for leasing in Sale No. 53 should be considered as an alternative to the proposal, since the DEIS did not sufficiently characterize the potential impacts of leasing in each basin.

Some commentators recommended the consideration of other deletion options for the purpose of mitigating or avoiding potential impacts to specific resources or uses of the ocean or coastal zone. These deletion alternatives involve specific tracts in one or more of the basins.

A number of revisions to proposed lease stipulations and additional lease stipulations were recommended by commentators. It was indicated by these commentators that these revisions or additional stipulations would assure more adequate mitigation of potential impacts in a number of areas: biological resources, cultural resources, marine birds and mammals, and conflicts with fishing.

Response:

Although the DEIS examined potential impacts from leasing in all of the proposed basins, the FEIS has been revised to clarify the site-specific or regioned impacts expected from the proposal in each basin. The deletion of each basin has been considered as an alternative to the proposal. The exploration and development activities expected to occur in each basin and the resulting significant impacts are discussed in Chapter II of the FEIS. Chapter IV of the FEIS has also been substantially revised to portray more clearly the impacts of the proposal on a site-specific basis.

In response to numerous comments, a number of other alternatives to the proposal, in the form of deletion options are considered in Chapter II of the FEIS. These include tract deletions to enhance protection of sea otters, commercial fisheries, marine sanctuaries, sensitive biological areas, and tract deletions due to geohazards. These tract deletions recommendations are also included in the appropriate summaries of issues which follow in this section.

All revisions to lease stipulations or additional stipulations which were recommended by commentors were given thorough consideration prior to final formulation of the stipulations which appear in the FEIS. These recommendations were discussed among those DOI agencies with interest and expertise in the OCS program pursuant to requirements of Secretarial Order #2974. The stipulations determined by the Department to warrant adoption are included in Chapter I as mitigating measures included in the proposal. See the appropriate summaries of issues and responses which follow in this section for disposition of the comments received regarding specific stipulations.

Issue #2: Alternative Energy Sources

Numerous commentors, both at the public hearings and in written comments, recommended that the EIS should include a discussion of alternative energy sources which could meet the needs of the region and the nation in lieu of oil and gas resources which may result from this proposed sale. Commentors pointed out the efforts to develop alternative sources of energy and to conserve energy that are being pursued by many individuals and jurisdictions of the California coastal regions. Many of these commentors supplied information regarding these efforts and State and local policies which encourage conservation and the development and use of alternative energy sources.

Specific comments were received regarding the role conservation may play in reducing the region's and the nation's future energy needs, the availability of onshore oil and gas resources and capability of other energy sources such as solar, geothermal or hydroelectric power to meet energy needs.

It was recommended by some that proposed Sale No. 53 be cancelled due to the relatively high environmental risk and low resource expectation from the proposed sale and that the potential energy loss be met by alternative sources and conservation.

Commentors: Many written and oral comments from individuals, groups and organizations.

Response:

The question of alternative energy sources is an important one to society, and one that must increasingly enter into private and governmental decisions. Attention must be directed toward changing the relative share of energy supplied by conventional sources and new alternative energy sources must be evaluated and their use increased in the nation.

However, these are programmatic level questions. They involve an overview of the problem. The national and international energy situation must be evaluated and analyzed. This overview focuses on regional and national energy market demands, and economic relationships are projected. These issues are addressed by the Department of Energy, and one aspect of that analysis involves setting rates of production for leases on Federal lands. Projections of oil and gas production from the OCS are one component of that evaluation. This discussion is presented in the Final EIS (January 1980), "Five-Year OCS Oil and Gas Lease Schedule," and, thus, is not examined further in this EIS.

Issue #3: Air Quality

Owing to the highly technical nature of the Sale No. 53 air quality study, most of the specific comments on this subject were from oil industry representatives and public agencies with expertise in air quality. Their major comments and our responses are summarized below:

a) Several industry commentors and local APCD's thought that the analysis was overly conservative, i.e. the multiple worst case assumptions tended to overstate potential impacts. Several air pollution agencies felt that in order to establish true worst case impacts, the maximum resource estimates should be used for modeling rather than the mean resource estimates.

b) Some air pollution agencies recommended that the effects of the new DOI air quality regulations for the OCS should be included in the analysis of air quality impacts.

c) One APCD felt that the projected air quality baseline used in the analysis was inconsistent with the local air quality maintenance plan (AQMP).

d) It was recommended that the FEIS should acknowledge the requirements of Section 176(c) of the Clean Air Act which calls for a determination of conformity with the applicable State Implementation Plan (SIP).

e) It was recommended by some commentors that the emission reductions of the air quality deletion option in the DEIS should be re-evaluated.

f) It was recommended that the FEIS include a discussion of the effectiveness of both the DOI air quality regulations and the proposed regulations for the California OCS in mitigating projected Sale No. 53 air quality impacts. If existing controls are found to be inadequate, additional controls should be proposed.

Commentors: EPA
Air Resources Board, State of California
San Luis Obispo County APCD

San Francisco Bay Area APCD
Humboldt County APCD
Beryl Reichenberg, Clean Air Coalition
W. L. Richter, Exxon USA
Western Oil and Gas Association (Represented by Dames and Moore)
Monterey Bay Unified APCD

Response:

a) Because of the nearly total lack of specific project design detail, we have of necessity made multiple worst case assumptions as described in the EIS. We agree that compounding of these worst case assumptions can greatly overstate impacts. This is an unavoidable weakness of this approach. We believe, however, that this method does provide estimates of reasonably expected upper limits to Sale No. 53 impacts. Several changes in the text have been made to emphasize that the analysis is based upon a worst case scenario. In addition, several minor technical errors have been corrected.

Under Council on Environmental Quality regulations (Federal Register, August 1, 1973, page 20553) the EIS must contain an assessment of the probable environmental impacts of the proposed action. The probable level of development from Sale No. 53 is given by the mean resource estimate; thus, the emphasis in the air quality impact assessment was based upon this value. The high and low resource estimates were not ignored. For these less probable levels of development, a complete emissions inventory was developed. The analysis showed that emissions are roughly proportional to the resource estimate. Air quality impacts would also vary proportionally with resource estimates; however, to a much lesser extent than emissions.

b) The new regulations had not been promulgated at the time the DEIS was prepared. We have reanalyzed impacts based upon the degree of control mandated by the new regulations. The results of this analysis have been included in the FEIS and in Reference Paper No. 53-5. Many of the changes made in the DEIS as a result of the supplemental analysis have also responded to the expressed concerns of several agencies. Examples are the air quality buffer zone (deleted in the Final EIS) and possible ozone standard violations in Point Arena (no longer predicted).

c) The photochemical model used in this analysis projects future baseline air quality levels based upon the projected AQMP emissions inventory combined with a worst case meteorological scenario. This methodology predicts future ozone levels higher than those shown in the AQMP. The AQMP, on the other hand, utilized a regional rollback technique to project future air quality. The apparent discrepancy is due to the differences in modeling approach. The Sale No. 53 analysis used a conservative worst case approach with a model (RAPT) designed to predict localized project specific impacts. The AQMP projections correctly used a regional modeling approach. There is no reason to expect that the results of the two methodologies would be consistent. The approach taken in the RAPT modeling was necessary in order to most accurately predict the increment from Sale No. 53-related sources.

d) Projected emissions from OCS facilities would not significantly delay the attainment of air quality standards as prescribed by the State Implementation Plan. As the FEIS indicates, existing regulations would prevent pollutant concentrations from exceeding DOI significance levels and National Ambient Air Quality Standards.

e) The new OCS air quality regulations provide additional air quality protection for those tracts located closer to shore, thus the six mile buffer zone alternative has been deleted from further consideration. The impact reductions predicted due to the six mile buffer zone were based upon EPA Gaussian modeling and USGS estimates of resource potential. DOI cannot publicize resource estimates for each tract prior to the lease sale as this would influence the competitive bidding process. Thus, in the DEIS we could not provide a full technical analysis of the claimed impact reductions. The emission and air quality impact reduction estimates were made only after a thorough technical analysis of all the data.

f) The final OCS air quality regulations are discussed at length in Reference Paper 53-5. Existing DOI air regulations (including the cumulative impact provision) are adequate to protect ambient air quality standards from potential Sale No. 53 impacts.

Issue #4: Water Quality

Many of the comments received regarding the treatment of water quality in the DEIS pointed out, in varying degrees of specificity, that there was insufficient information to adequately analyze and support conclusions as to impact on water quality resulting from the proposed sale. More specifically, comments were directed at the lack of information regarding nearshore currents and long-term chronic effects of drilling muds and formation waters on marine organisms.

Some comments recommended that further analysis be provided in the FEIS of the impacts of potential water quality deterioration (due to drilling muds, formation waters, oil spills, etc.) on Areas of Special Biological Significance, on resources present in proposed Marine Sanctuaries and Estuarine Sanctuaries, on salmon and other anadromous fish.

Comments requested that the FEIS document studies, planned or underway, which will contribute to better understanding of long-term sublethal effects of drilling muds and cuttings. It was recommended that mitigating measures such as the location and capabilities of oil spill response equipment, and EPA's authorities over discharges from offshore operations should be dismissed more thoroughly in the FEIS. Some comments requested that the additional risk that may be associated with deepwater drilling or drilling in areas of seismic activity should be factored into the analysis of potential impacts on water quality.

Commentors:

- 1) Beth Sparkuhl - Mendocino County Technical Advisory Task Force
- 2) Durt Kupper - Board of Supervisors, San Luis Obispo County

- 3) League of Women Voters - San Luis Obispo County
- 4) Fred Lyon - Supervisor, San Mateo County
- 5) League of Women Voters - Santa Cruz
- 6) EPA

Response:

Additional and more current information on water quality and toxicity of drilling fluids and petroleum hydrocarbons was included in the revisions to the EIS in response to comments concerning the lack of information supporting water quality impact conclusions. Much of the information from the 1980 Symposium on Research on Environmental Fate and Effects of Drilling Fluids and Cuttings was included in the revisions.

Section II A.2.b was revised to include pertinent references for summary statements in this section. Included in the revision of this section is a summary discussion of impacts from accidental or chronic hydrocarbon discharges.

The discussion of physical oceanography (Section III A.1.b) was revised to include more up-to-date references and a basin by basin discussion of near-shore currents was added. A discussion of "average" wave conditions was included in this section.

Chapter IV was expanded to include detailed discussions of hydrocarbon discharges and effects on marine organisms, (Section 5.a and 1.b), effects of turbidity increases (Section 1.b), mobilization of pollutants from sediments, food web magnification (1.b.), fate and effects, both short-term and long-term, of drilling fluids and trace metals (1.b.), formation water effects (1.b.) and hydrocarbon effects (toxicity, reproductive effects, carcinogenicity, food web magnification, and uptake). (1.b.).

The EIS was revised to indicate EPA's responsibility for discharges into the OCS environment (Section IV A.5.a.). The discussion in Section IV B.1.b. identifies short-term impacts versus chronic or long-term impacts and has been extensively revised to indicate results of Drilling Muds Symposium, January, 1980. Many more references to statements in the EIS have also been added. The information regarding radionuclides has not been documented by reference but has been left in the EIS.

Issue #5: Oil Spill Risk Analysis

Many comments received were directed to the oil spill risk analysis conducted for the DEIS. Comments reflected these areas of concern: (a) the adequacy of data (winds, currents, spill probabilities) used as input into the oil spill model, (b) the incorporation of the oil spill model results into the impact analyses, and (c) the availability of measures to mitigate potential adverse impacts of oil spills.

a) A number of comments suggested that the wind and current data used to compute spill trajectories was inadequate. The basis for this comment is that final results of two studies, Summary and Analysis of Available Physical Oceanographic and Meteorological Data for Offshore California

and the Northern California Meteorological Buoy Placement for Offshore Wind Data, are not yet available, and that this information is necessary to improve the accuracy of the model.

It was also recommended that extreme weather conditions or sea states, and seismic events be taken into consideration when determining spill probabilities.

Some commentators criticized the basis on which spill rates and probabilities were determined. Comments criticized the use of oil production volume as an exposure variable for tanker spills, the use of 1000 bbl as a dividing line between large and small spills, and stated that the presentation of spill probabilities in addition to the statistically expected number of spills is necessary to provide meaningful information to the public and decision makers. Dames and Moore provided a reanalysis of oil spill probabilities using as exposure variables, well-years (blowouts), platform years (platform spills), and tanker years (tanker spills). Results of the reanalysis included a summary of total expected oil spill occurrences (greater than 1 bbl), statistically expected numbers of spills greater than 10, 100, 1000, 10,000 and 50,000 bbl, and the probability of occurrence of zero, one, or more than one spill for each size class.

Some commentators indicated that without further explanation of the model itself and the data used as input, it is not possible to evaluate the accuracy or reliability of the model.

b) Some comments recommended that oil spill impacts on resources or land segments be evaluated regardless of the likelihood of impact indicated by the oil spill model. It was noted by some commentators that joint probabilities (the probability of a spill occurring and impacting a particular resource or land segment) were not computed for the Eel River basin because Geological Survey resource estimates indicated that no oil in commercial quantities would be found in this area.

Many commentators expressed a general concern about oil spill impacts on valuable resources in the proposed sale area, citing potential adverse effects on fisheries, estuaries, beaches, tourism, Native American cultural resources, and marine birds and mammals. Many of these commentators requested more detailed evaluation of these potential impacts.

It was also recommended that more evaluation of long-term, low level oil pollution is needed in the EIS.

c) Various comments were received regarding the availability and effectiveness of oil spill containment and clean-up equipment. Most comments in this regard indicated that there was not presently sufficient containment and clean-up equipment deployed or available at critical locations in the proposed sale area, and that the capabilities of such equipment are not sufficient to contain spills or allow clean-up prior to their hitting shore given the sea states often found in this area. It was indicated by some that remoteness of some of the shoreline would complicate clean-up efforts, and that clean-up efforts (use of dispersants, cleaning of beaches) may do more harm than good.

Some commentators recommended adoption of lease stipulations to require availability of containment and clean-up equipment at specific locations.

Commentors: California Coastal Commission
AMBAG
Friends of the Coast
Environmental Action of West Marin
League of Women Voters of Marin County
Mendocino County
Salmon Trollers Marketing Association
Sierra Club, Redwood Chapter
Office of American Indian Coordination, State of California
San Mateo County
Peninsula Conservation Center
Office of the Mayor, San Francisco
Friends of the Earth
Safety System Management, Inc.
ARCO
Natural Resources Defense Council
Inverness Association
League of Women Voters, Santa Cruz County
California Department of Fish and Game
League of Women Voters of California
Greenpeace
San Luis Obispo County
Morro Coast Audubon Society
Dames and Moore (for WOGA)
Sierra Club, Santa Lucia Chapter
Audubon Canyon Ranch
Santa Cruz County
Sierra Club
BLM - Bakersfield
Office of Planning and Research, State of California
U.S. Coast Guard
U.S. Geological Survey
League of Women Voters, San Luis Obispo County
Santa Barbara County
U.S. Fish and Wildlife Service
San Francisco Bay Conservation & Development Commission
Sonoma County
City of Pismo Beach
Marin County
Friends of the Sea Otter
U.S. Department of Commerce
City of Grover
EPA
Corps of Engineers
Numerous individuals also made written and oral comments

Response:

a) There were several references to the Physical Oceanographic and Meteorological Data Summary Study being done by NOAA that is not available yet. This report is a compilation of existing data and is not providing any new data. BLM has been coordinating with NOAA and is aware of the available information and has also reviewed the draft of this report being prepared by NOAA. The best available information applicable to the oil spill model has been used and is documented in the oil spill model section of the final EIS.

The revision of the oil spill model section (Section IV. A.1.) of the Final EIS has been expanded to address all comments received regarding data and methodology employed in the oil spill model.

b) Sections of the FEIS analyzing impacts of oil spills on various resources include discussions of oil spill impacts whether or not the oil spill model indicates a major risk of spill contact. The oil spill model results are used only as a tool to indicate the potential likelihood of a resource being contacted by an oil spill.

c) Oil spill mitigation and behavior is addressed in more detail in the FEIS. Oil spill cooperative equipment available in Long Beach and San Francisco was given in the DEIS as an example of the type of response that has been provided in the past. Prior to any development in a remote area (beyond the rapid response of available standby equipment) equipment will be required that can be rapidly deployed.

Issue #6: Biological Resources (Except Marine Mammals and Seabirds)

Comments received regarding this issue reflected several general concerns: coverage in the DEIS of potential impacts on biological resources was too general and should be revised to provide more specific analysis of impacts in each basin; conclusions regarding impacts are not supported by data or references and more information is needed before conclusions can be drawn; and analysis in the DEIS relies too heavily on predictive capabilities of the oil spill model.

Comments from the Department of Commerce (NOAA) recommended deletion of particular tracts from the proposed sale in order to reduce or mitigate potential adverse impacts. They recommended that tracts be deleted to provide a 6 mile buffer zone from the Pismo Clam Refuge, Nipomo Dunes. The City of Pismo Beach recommended deletion of tracts to provide a 9 mile buffer from the proposed underwater park from Morro Bay south to Shell Beach.

Comments were also received which recommended revision of the lease stipulation to protect biological resources. Concern was expressed that too much discretion is allowed to the Supervisor in invoking the requirements of the stipulation, and that the requirements should be mandatory on all leases since so little is known of the biological resources of the area.

Comments from EPA suggests that the Area of Special Biological Significance (ASBS) that stretches from Point Areana to Pismo Beach, and the Point Reyes/Farallon Islands Marine Sanctuary are not discussed in sufficient detail. Also further discussion of the Monterey Bay Marine Sanctuary and Elkhorn Slough Estuarine Sanctuary is needed.

Commentors: Natural Resources Defense Council
City of Pismo Beach
San Luis Obispo County
Department of Commerce
Department of Fish and Game, State of California
AMBAG
San Mateo County
Dr. Joel Hedgpeth
EPA

Response:

The FEIS sections regarding both description and impact analysis of biological resources and sensitive biological areas have been revised by including more detail and citing specific references where possible. Also, discussions of estuaries and intertidal areas have been expanded and made more site-specific. Discussions of kelp, benthos and plankton have been made as site-specific as practical. Oil spill impacts on these resources have been examined in all cases, and additionally, results of the oil spill model have been used to indicate the likelihood of impact to these resources. (See Sections III. A.2 and IV.B.2).

Section II of the FEIS has been substantially revised. The deletion of each basin has been considered as an alternative to the sale, and other deletion options for specific mitigation have been considered. (e.g. deletion option for Biologically Sensitive Areas) Please see Section II for a discussion of impacts expected to be reduced by these deletion alternatives.

The biological resources stipulation proposed for leases which may result from this sale requires that special surveys be conducted should it be determined that there is a biological resource of special sensitivity on a particular lease. Existing information results of BLM's ongoing environmental studies program, and new information from any other sources will be used to advise the Supervisor, USGS, as to which leases should require the survey.

Issue #7: Marine Mammals and Seabirds

A number of the comments received on this issue stated that the description and impact analysis on marine mammals and seabirds in the DEIS was too general; not enough information has been provided to accurately describe the significance of these resources in the various regions within the proposed sale area and site-specific assessment of impacts is lacking.

It was noted that final results from some ongoing studies (effects of oil on marine mammals, effects of sound on marine mammals, and a marine mammal and seabird aerial survey) were not available for inclusion in the DEIS. Comments were received which indicated that the sea otter range used

in the oil spill model was inaccurate, and the State of California's rare and endangered species should be listed and described in the FEIS.

A number of comments suggested that the impact assessment in the FEIS should be improved in the following ways: impacts on the common murre should be examined, impacts on the marine mammals and seabirds in the Channel Islands area should be examined; too much emphasis was placed on the prediction capability of the oil spill model; impact analysis of oil spills on all important resources should be done regardless of the oil spill model prediction; impacts of small (1000 barrels) should be analyzed.

Some commentators recommended deletion of particular tracts from the proposed sale in order to reduce or mitigate impacts on marine mammals and seabirds (with a consequent reduction in impacts to other resources in some cases). The Department of Commerce (NOAA) proposed the following tracts deletions for the reasons indicated:

<u>Tract</u>	<u>Resource Conflict</u>
031,017,018,022,023	Salmon and crab fisheries
026,027,030	Harbor seals
33	Ocean shrimp, shellfish, Harbor seals
	Stellar sea lions
62,64	Harbor seals
71,72,75,76,78,	Harbor seals and Stellar
80,82,84,86,88	sealions
91,92,94,95,98,99,103,107	
111-113,118,122,125,127,128	Harbor seals, Stellar sealion
	elephant seals
131,134,137,138,141,142,144-147	Ocean shrimp, Harbor seals,
148-151, 153-155, 160,161,167,168,	and California sealions
174,175,181,182,187-189, 195,196,	
201-203,207-210,215-217,222-224,	
227-229,232-243	

The Department of Commerce recommended that the sale be delayed for approximately two years pending completion of numerous environmental studies. In lieu of a delay, the above tracts are recommended for deletion due to a stated lack of oil spill containment equipment, the long time needed to deploy such equipment and adverse weather conditions in the sale area.

The California State Department of Fish and Game recommended the deletion of the following tracts for the reasons indicated.

<u>Tract</u>	<u>Resource to be protected</u>
7,10,11,15,16,20,24	Petrale sole spawning area
48,52,60	Abalone harvesting areas,
	seabird rookeries
78,80,84,88	James V. Fitzgerald Marine Reserve
138,142,143,145,146,148,150,151	seabird rookery and sealion haulout

The California Coastal Commission also recommended that a number of tracts in the Santa Maria area be deleted for the protection of sea otters.

The Department of Commerce also recommended the revision of the lease stipulations for protection of biological resources and the pipeline stipulation, and recommended including in the proposal a stipulation requiring restriction on aircraft overflight and surface vessel disturbance of marine mammal and seabird habitats, and a stipulation requiring training of OCS personnel on the methods and practices of commercial fishing operations.

Commentors: State of California, Department of Fish and Game
Friends of the Sea Otter
Dames and Moore (for WOGA)
County of San Mateo
Department of Commerce
Fish and Wildlife Service
Aryan Roest, Biologist

Response:

In the FEIS the sea otter range was not analyzed as a whole, as it was in the DEIS, but analyzed by each land segment. A tract deletion alternative based on this analysis was developed and included in Section II of the FEIS.

The Black Rail, a California listed rare bird, the common Murre and the marine mammals and seabirds of the Channel Islands have been included in the analysis in the FEIS. Important marine mammals and seabirds and their habitats received some analysis regardless of the oil spill models prediction. Discussion of the impacts of large spills is generally applicable to expected impacts from small spills. Since most spills are expected to be small (Section IV.a. of the FEIS) and would not reach any significant marine mammal and seabird resource area, their impacts did not receive any additional discussion.

NOAA's recommendation for tract deletion did not specify what kinds of impacts would warrant deletion of these areas. The conclusion made in the FEIS is that generally, pinnipeds are not very susceptible to OCS related impacts and that areas of highest use Ano Nuevo, Farollane Islands, Pt. Reyes, etc. are not likely to be impacted by oil spills. However, the FEIS contains a discussion of the deletion of each basin as an alternative to the proposal and identifies the significant impacts from leasing in each of these areas. California Department of Fish and Game's recommended deletion alternative included tract deletions in areas of small risk (e.g. tracts 48,52,60) or in areas already included in other alternatives (the Sea Otter Alternative).

The impact section for marine mammals and seabirds has been reorganized and rewritten. The discussion has been made thorough and detailed and has been made as site-specific as possible.

Preliminary results from the marine mammal and seabird aerial survey, seabird nesting survey, characterization study and effects of sound on marine mammals study have been incorporated into the analysis in the FEIS.

Issue #8: Marine Sanctuaries

Some comments received recommended that the FEIS should contain more detailed description of the marine sanctuary proposals in or near the proposed sale area. Detailed information regarding the purpose and status of the sanctuary proposals was provided in comments from the Department of Commerce. It was noted that the proposed Channel Islands Marine Sanctuary and the Point Reyes Farallon Islands Marine Sanctuary proposals are nearing the point of final designation and that potential conflicts with these proposals and impacts on the resources contained in these areas should be analyzed in the FEIS.

Comments from the National Resources Defense Council (NRDC) requested that the FEIS consider tract deletion alternatives addressing possible conflicts and impacts resulting from tracts which may fall within the boundaries of the Point Reyes-Farallon Islands proposal and the Monterey Bay proposal.

Commentors: Department of Commerce
NRDC

Response:

Description of the proposed Marine Sanctuaries in and near the proposed sale area have been included in Section III of the FEIS. The primary purpose of the sanctuary proposals is to protect the valuable marine life (marine mammals, seabirds, and others) of the areas. The FEIS, of course, addresses fully the expected impacts of the Sale No. 53 proposal on these resources. Section II of the FEIS has been revised to include specific tract deletions as alternatives to the proposal which would further mitigate potential conflicts with marine sanctuary proposals. Additionally, each basin in the proposal has been considered as a deletion alternative incorporating discussion concerning the significant impacts expected from leasing in each basin.

Issue #9: Commercial and Sport Fisheries

Many comments were received regarding the treatment of commercial fisheries in the DEIS and a few comments were received concerning the treatment of sportfishing. Numerous comments recommended that the importance of central and northern California commercial fishing industry be emphasized since it is a mainstay of local economics and of world importance. It was indicated that more recent data on commercial and sport fisheries is available and should be used in the FEIS, and that the results of an on-going studies are needed for analysis of impacts. Additionally, commentors recommended that fisheries be examined on a basin-by-basin basis rather than attempting a general treatment on a sale area-wide basis and using data from the 1969 Santa Barbara oil spill.

Comments received recommended that the following potential impacts/conflicts be examined more thoroughly in the FEIS:

- a) The potential impacts on mariculture and non-commercial species.
- b) The potential for unburied pipelines to impact Dungeness crab migrations.
- c) The potential impact of liquid condensates which may be released from a gas well blow-out.
- d) The effect of seismic boat operations on commercial fishing.
- d) The impacts on the ecosystem should one species be substantially decreased due to OCS oil and gas activities, the effects of an oil spill on the 5 year life cycle of Chinook salmon, the effects on other vulnerable species (e.g. species with epipelagic eggs), and the effects of chronic pollution.
- f) Space use conflicts between oil and gas platforms or rigs and commercial fishing during the life of these structures and after their removal.
- g) The onshore space use conflicts that may arise between fishing fleets and OCS related boats.
- h) The regional economic ramifications of adverse impacts on commercial fisheries.
- i) The effects on recreation and tourism from impacts to marine resources.

Some comments were directed to the discussion of measures to mitigate or compensate for impacts on commercial fisheries. It was recommended that the necessity and effectiveness of measures as the pipeline stipulation, the Fishermen's Contingency Fund, and OCS Orders be discussed in the FEIS. Further measures which would reduce impacts on fisherman, set up funds to restore fisheries, and upgrade harbor facilities were proposed. Numerous highly specific comments were also received.

The following specific groups of tracts were recommended for deletion for the reasons indicated

<u>Tract</u>	<u>Fisheries Resource Protected</u>
1-3,5-7,9-11,14-16,19,20,24 7,10,11,15,16,20,24 48,52,60 3,4,7,8,11,12	Dover and Petrale sole spawning areas Petrale sole spawning area Abalone harvesting area Hardrock outcrop area of biological significance that supports a mid-water trawl fishery
138,142-143,145-147,149-151,153-155, 159-161,166-168,174-175,189,196, 202-203,208-210,215-217,1/2 222, 223-224, 1/2 228,229, 230, 234, 1/2 237, 238, 1/2 240, 241-243	High-yield/high priority commercial fishing grounds
13,17,18,22,23,26,27,30 033	Salmon and crab fisheries Ocean shrimp and shellfish

131,134,137,138,141-151, Ocean shrimp
153-155,160,161,167,168,174,175,
181,182,187-189,195,196,201-203,
207,210,215-217,222-224,227-229,
232-243

One commentor recommended that mitigation measures be employed to protect the Dover and Petrale sole spawning areas overlapping tracts 14,15,19,20,24.

Commentors: State of California, Dept. of Fish and Game
California Coastal Commission
Fishermen's Marketing Association
Mendocino County Technical Advisory Task Force
Chevron U.S.A., Inc.
San Luis Obispo County Board of Supervisors
Humboldt Fishermen's Marketing Association, Inc.
Humboldt County OCS Advisory Panel
North Coast Regional Commission
Humboldt County Board of Supervisors
Pacific Coast Federation of Fishermen's Associations
Salmon Trollers Marketing Association
Dr. Thomas Richards
Ron Baker
Dr. Milton Boyd
Dames and Moore (for WOGA)
Lionel Gambill
Diana Wiedemann
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
Alida Solis
Natural Resources Defense Council
San Mateo County Board of Supervisors
AMBAG
U.S. Department of Commerce
Kathy Gault
Dr. Richard Creasa
U.S. Geological Survey

Response:

The commercial and sport fisheries sections of the DEIS were substantially revised and expanded for the FEIS. The importance of the central and northern California commercial fishing industry has been indicated and a basin by basin treatment has been utilized where appropriate. The most up-to-date, site-specific catch and landing data available from the California Department of Fish and Game have been incorporated and interim reports of on-going studies have been consulted, when available.

More emphasis has been placed on impacts to the mariculture industry and to non-commercial species. Analysis of economic losses based on the 1969 Santa Barbara oil spill has been replaced by a more basin specific analysis. The potential for unburied pipelines to impact Dungeness crab migrations,

for liquid condensates from a gas well blow-out to affect commercial fisheries and for seismic boat operations to impact commercial fishing have been noted. The impacts on species populations and on the ecosystem from chronic and short-term pollution have been more thoroughly discussed in the commercial fisheries, estuary and water quality sections. The commercial fisheries impact section has been reworded to clarify the anticipated impacts of oil on salmon. Space use conflicts both offshore and onshore have been more thoroughly addressed and the potential for impacts to support, processing, transportation and marketing industries have been noted. The potential for impacts on marine resources to effect recreation and tourism has been indicated. The Fishermen's Contingency Fund has been discussed in detail (see Section I. B.7.c) since several commentors requested that the EIS provide a detailed discussion of its advantages and disadvantages. Stipulations and OCS Orders that apply to fisheries have also been clarified. Other measures proposed to reduce impacts on fishermen or to compensate them for losses were not incorporated because 1) these measures did not seem administratively feasible or 2) current regulations and alternatives should provide adequate resource protection or adequate compensation for losses. Specific comments were addressed throughout the commercial and sport fisheries sections.

In response to the recommendations for tract deletions, alternatives 8 and 9 were developed. Alternative 8 incorporates the Petrale and Dover sole spawning grounds that overlap the Eel River Basin tracts. Alternative 9 incorporates the hard-rock outcrop in the Eel River Basin and the tracts recommended for deletion to protect Abalone harvesting areas. Other tract deletion recommendations are not incorporated as specifically suggested because 1) there is not sufficient justification or 2) regulations and alternatives should provide adequate resource protection or adequate compensation for losses. However, each basin has been considered as a deletion option and discussion provided of significant impacts potentially resulting from leasing in each basin.

Issue #10: Recreation and Tourism

Comments received on the recreation and tourism aspects of the DEIS were of two general types. Some comments indicated that data used in the DEIS were out of date or inaccurate, while other comments criticized the analysis of impacts on recreation and tourism.

A major criticism of the treatment of recreation and tourism was that the data used was insufficient to accurately characterize the importance of recreation and tourism to local economies. For example, recreational areas and State parks were not accurately depicted on the visuals, and recreation area use figures and the extent of local areas economic dependence on tourism were not discussed in detail in the DEIS.

Similarly, the criticisms of the impact analysis indicated that the analysis was not carried through to the local level. A number of commentors recommended that more detailed analysis of the impacts on each area's recreational resources be conducted, and that the economic impact of potential reductions in tourism (due to oil spills, other adverse impacts) to local economics be examined. Some commentors questioned the validity of the conclusion (II.A.2.g) that the overall impact of the proposal on recreation

or tourism would be minor because if any particular local area were adversely impacted, tourism and recreationist activity would shift to another non-impacted locality.

Two areas were recommended for deletion due to impact on recreational areas. One called for a nine mile buffer zone around the two proposed underwater parks between Morro Bay and Port San Luis. The other called for deletion of the group of 26 tracts known as "P 12" at the south end of the Santa Maria Basin in order to protect the Channel Islands National Park.

Many commentors expressed general feelings that the proposed sale would result in degradation of the environment which they find aesthetically appealing, rich in natural resources, and spiritually regenerating. Specific comments and Commentors are partially listed below.

Recreation or Tourism data inadequate and outdated

State of California Office of Planning and Research
California Department of Fish and Game
Board of Supervisors San Luis Obispo
California Department of Parks and Recreation
County of San Mateo
Sonoma County

Concern for Impacts on local economies

State of California
California Coastal Commission
League of Women Voters
California Dept. of Parks and Recreation
Board of Supervisors, San Luis Obispo
Sonoma County
County of San Mateo
AMBAG

Numerous Agencies, Societies, and Individuals in addition to supplying comments also supplied updated information on recreation. A partial listing follows:

Santa Cruz Convention and Visitors Bureau
People for a Golden Gate National Recreation Area
Fort Bragg
Sequoia Audubon Society
County of San Mateo
Mendocino County OCS Task Force
California Coastal Commission

Response:

The comments regarding the inadequacy and outdatedness of the data were noted and were responded to in the FEIS by increasing the data base and by updating all the information where possible, which required a major revision of Section III.B.2.a. (Recreation).

The comments regarding the impacts on the local economies were responded to by increasing the scope and coverage of the impacts with references to impacts on local economies caused by spills in other areas. Sensitive Recreational areas are listed at a site-specific level (Table IV B.5-3). Incorporation of these impacts required a revision of Section IV B.5 and II A.2.g.

Comments received on Visual No. 9 (Recreation) were responded to by including the Golden Gate National Recreational area and the Channel Island National Park on Visual Errata Sheet No. 2

Several comments called for the deletion of tracts to protect recreational areas. These deletions have been included in the various appropriate alternatives listed in Section II B.3. Among these are: the call for a buffer zone for the underwater park in San Luis Obispo County, which is covered in alternatives 5,7,11 and 12; A call for a protection of the Channel Island National Park which is covered in alternatives 5,11 and 12; Protection of Pt. Reyes and the Golden Gate National Recreational Area which is covered in alternatives 3,4 and 12.

Information supplied by the commentators on the recreation and tourist industry were incorporated into the FEIS wherever feasible.

Issue #11: Socio Economic Impacts

Many of the comments regarding the treatment of the socio-economic effects of the proposed sale criticized the lack of quantitative evaluation of socio-economic impacts at the local level. Many commentators criticized the use of the Curtis Harris Economic Model to evaluate the impacts of the proposal. It was noted that this model provided impact information only at the county level while coastal community impacts were of primary concern. It was also pointed out that this model did not take into consideration certain specialized conditions within some counties or areas such as insitutional controls, land use policies, or geographic factors.

A number of commentators presented very specific criticisms regarding the extent or currency of the data base or particular parameters used in the socio-economic analysis in the DEIS.

Some comments suggested that the DEIS did not adequately evaluate the economic effects of OCS related impacts on certain resources such as tourism and commercial fishing. Given the importance of these industries to many local economies in the area, if they were to be adversely impacted by OCS activities, what would be the resulting effect on local economies? The concern was expressed that in assessing the national benefits of OCS oil and gas, the impacts on local economies not be overlooked.

Some commentators noted that there has been sub-county economic modeling in some California coastal regions and suggested that these or similar sub-county models be used to evaluate the effects of proposed Sale #53.

Commentors: Association of Monterey Bay Area Governments
League of Women Voters - San Mateo County, San Luis Obispo
County of Santa Cruz
County of San Luis Obispo
Dames and Moore (for WOGA)
and many other oral and written comments

Response:

The discussion of socio-economic impacts was considerably expanded for the Final EIS. Additional discussion was provided on the Harris model. Information was included on the data base of the model, particularly as it relates to demography (Section III. D.2.c.).

There were a great number of oral and written comments concerning the appropriateness of using the Harris model in an assessment of socio-economic impacts. Most of these comments noted that the model derived impacts at the county level and felt that impacts need to be assessed on a more local basis, particularly in terms of coastal cities or the immediate coastal region. The Harris model has been retained for use in the Final EIS because the nature of the project and the required analysis is regional in character. Many of the important parameters that would define the scope of the project are unknown at this time (See Section IV.B.6). Attempting to derive the very site-specific information desired, before exploration has taken place, is attempting for a degree of resolution in the output data that is not warranted by the type of information that is available prior to exploratory activity.

A discussion, however, has been included on the extent and limitations of the Harris model, and note was made that the Harris model, like any other economic model, may have to make some simplifying assumptions so that the model is workable and manageable (see latter part of Section IV. A.6). A complete discussion of the data and relationships existing within the Harris model can be found in the two books referenced in Section IV.A.6.

Additionally, the socio-economics section has been expanded to include a generic discussion of oil and gas development phases. The characteristics and requirements of each phase are noted, and the discussion points out the kind of probable local impacts. (See latter part of Section IV.B.6). The discussion of exploration and development plans, which will be required before those phases begin, has also been expanded (Section I.B.7.g).

The economic impacts from OCS development on such activities as tourism, recreation, or sports fishing are evaluated separately in particular sections of the Final EIS. As noted in the latter part of Section IV.A.6, the Harris model is an economic quantification of important elements in a market system (e.g., prices, income, employment) analogous to national income accounting (which derives GNP and related statistics). Thus, the structure of the Harris model may be such that it is not easily amenable to a detailed impact analysis of these sectors, and so a discussion of these important elements is reserved for separate sections.

Some commentors noted that sub-county modeling had been done previously for OCS Sale No. 48 (Southern California, 1979). Socio-economic analysis was done for Los Angeles County for that sale and an assessment was made of localized impacts. As is noted in Section IV.B.6 of this EIS, a sub-county impact analysis has also been done for OCS Sale No. 53. Pacific OCS Reference Paper 53-3 contains the complete report of this sub-county impact assessment for the nine-county Bay Area region (San Francisco, Marin, Sonoma, Napa, Solano, Contra Costa, Alameda, Santa Clara and San Mateo counties). This analysis uses all preliminary data currently available for an assessment of local and sub-county impacts for that nine-county region. Reference Paper 53-3, which is one of five supplements to the Sale No. 53 EIS, is available from the Pacific OCS Office.

Issue No. 12: Resource Estimates

Many commentors expressed the general concern that the limited resource potential of the proposed sale area (the USGS resource estimates for Sale No. 53) does not warrant the environmental risk of proceeding with oil and gas development in the area.

Several comments discussed other aspects of the resource estimates. Questions were raised regarding the use and significance of "conditional" and "risky" resource estimates and of "high" and "low" resource estimates in various sections of the DEIS.

Commentors: Association of Monterey Bay Area Governments
League of Women Voters - San Mateo County, San Luis Obispo
County of Santa Cruz
County of San Luis Obispo
Dames and Moore (for WOGA)
and many other oral and written comments

Response:

A great many commentors made varying comments relative to the resource potential and the balancing of possible environmental risks. The EIS and environmental review process is structured to address and evaluate this very question of whether the resource potential from OCS Sale No. 53 justifies the possible risks to the environment.

The section which discussed resource estimates, and particularly "conditional" versus "risky" estimates, was expanded and further discussion was provided which explains the use and applicability of these various estimates in the EIS (See Section I.B.2.b.). Additionally, this section explains the relevance of low and high resource estimates and how the impact analysis in this EIS relates to resource estimates.

An analysis of energy input and output requirements relative to proposed Sale No. 53 has also been included in the Final EIS. (See Section IV.B.15).

Issue #13: Relationship of the Proposal to the California Coastal Zone Management Program

a. Comments received on this issue generally indicated that there was insufficient analysis of the impact of the proposed on the State and local Coastal Zone Management Programs. Other comments stated that activities resulting from the proposed sale would be incompatible with Coastal Zone Management Programs of the State, counties and localities.

i) More specifically, commentators stated that the DEIS does not adequately analyze the effects of the proposed sale in each of the five basins of the policies of the California Coastal Zone Management Program. The relationship of the proposal to a number of California Coastal Act (CCA) policies, and the controls in the CCA that affect post-lease activities should be more thoroughly discussed. A number of these pertinent policies and authorities were cited or summarized in the comments received. These policies and authorities are intended to preserve parks and recreation areas determined suitable for such activities. Any onshore development resulting from the proposed sale would be subject to these policies and authorities.

ii) The California Coastal Commission indicated in their comments that the Point Area, Bodega, and Santa Cruz basins should be deleted from the sale since onshore and offshore development resulting from leasing of these basins would be incompatible with the Commission's goals of protecting the scenic and natural resources of Mendocino, Sonoma, Marin, San Mateo, and Santa Cruz County coastal areas. Regarding the Eel River and Santa Maria basins, the Commission stated that more environmental information is needed to make a determination as to whether the leasing of these two basins would be consistent with the CZMP policies, therefore, a decision on leasing in these areas should be delayed at least two years.

iii) The Department of Commerce (NOAA) recommends that DOI acknowledge its responsibility to provide the State with consistency determinations with respect to OCS pre-lease activities which directly affect the coastal zone.

b. Comments received regarding land use recommended that descriptive materials in the DEIS needed to be updated and reflect more accurately local land use patterns. Comments were also received which requested a more detailed analysis of local impacts on land use from possible onshore siting of OCS related facilities. Some comments received note that stipulations should be developed to mitigate certain onshore impacts of OCS related development.

i) A lease stipulation to require that oil and gas processing facilities resulting from the proposed sale be located onshore in order to lower oil spill risk and air pollutant emissions.

ii) A stipulation regarding the consolidation of onshore oil and gas processing facilities resulting from the proposed sale to prevent the proliferation along the coast of number of small OCS related facilities.

iii) A stipulation to require lessees to utilize an onshore pipeline to transport oil to refineries rather than allowing tankering of production in order to reduce oil spill risk and air pollutant emission.

Response:

Incompatibility of proposal with local area studies: Section I.B.8.a "Interrelationship of Proposal with other Projects and Proposals" was

expanded to include, where possible, a discussion of compatibility with local policies. This section also noted the progress of ongoing CEIP industrial siting studies presently being done in many of the counties to determine appropriate energy facility sites compatible with California's CZMP. In Sections I.B.8.a and III D.2 it was noted that any onshore development is subject to local development controls.

Inconsistency with CZMP of leasing of basins: Section I.B.3.b. noted that there is an unresolved dispute between DOI and California as to what actions "directly affect" the coastal zone and that Department of Commerce (NOAA) has been requested to define "directly affect" with more clarity.

Updated land use information should be utilized: This was done. Available LCP documents utilized in Section I.B.8.a., III B.1 and III D.2.a.

Request for more detailed analysis of local land use impacts from possible onshore siting of OCS-related facilities: Section IV B.7 "Impacts on Coastal Land Use" expanded to discuss generally the physical impacts of onshore facility sitings. There was also included a statement of probable impacts to specific local areas. However, at this stage this is merely speculation as the necessity of onshore siting of facilities has not yet been determined. Inclusion of stipulations regarding onshore processing facilities and/or pipelines: It is not within BLM's area of responsibility to formulate and apply lease stipulations concerning onshore oil and gas infrastructure (facilities and pipelines). This lies wholly within the purview of local and State jurisdictions.

Issue #14: Geohazards

Comments received on this issue generally reflected the concern that the analysis in the DEIS of geohazards and their significance in relationship to OCS oil and gas operations was too general. More detail is needed regarding the types of geohazards present in the sale area, their location, and their potential effects on oil and gas activities. Some commentators stated that further studies are required to obtain information sufficient to perform adequate tract specific analysis of geohazards.

Comments indicated that the following aspects of geohazards in the proposed sale area should be examined in more detail:

- a) Identify submarine canyons and channels (areas susceptible to sliding and subject to high velocity currents), slopes of 4% or greater (susceptible to mass wasting), irregular seafloor, and buried channels (areas of contrasting geotechnical characteristics).
- b) Assess the impact of seismicity on oil and gas operations. What are the effects of tsunamis, liquefaction of sediments, etc.?
- c) A basin-by-basin fault hazard study should be performed accurately locating faults, determining specific potential effects on oil and gas operations.
- d) The FEIS should indicate what data was used to reach conclusions regarding potential nature and effects of geohazards.

Comments from the State of California indicated that studies by USGS and its contractors were not complete in time to be used in the DEIS, and that geohazards data presented in the DEIS is accompanied by little or no interpretation or analysis. The DEIS does not explain how geohazards information will be used in on-going phases of the project, from sale decision through decisions or exploration and development.

The State of California also recommended that a supplemental DEIS be published, using updated, specific geohazards information, and proposing tracts for deletion. They provided an analysis of regional active faults and recommended that DOI perform a detailed fault hazards study for each of the five basins, and recommended a methodology to be used in interpreting significance of fault hazards for establishing pipeline routes and platform sites.

The State recommended a number of tract deletions due to slope instability. All or portions of 21 tracts in 4 of the 5 basins (listed below) are recommended for deletion, and an additional 39 tracts or portions thereof are recommended for further study due to slope instability prior to being offered for leasing.

Tracts recommended for deletion due to slope instability:

Eel River - 5(5 $\frac{1}{2}$), 6(5W $\frac{1}{4}$), 9, 10, 11(W $\frac{1}{2}$), 14, 15, 16(NW $\frac{1}{4}$), 19, 20(NW $\frac{1}{2}$)
Point Arena - 40, 58(W $\frac{1}{4}$)
Bodega - None
Santa Cruz - 128(E $\frac{1}{2}$)
Santa Maria - 221(5E $\frac{1}{4}$), 226(NE $\frac{1}{4}$, S $\frac{1}{2}$), 227, 231(NE $\frac{1}{4}$, S $\frac{1}{2}$), 232, 235(N $\frac{1}{2}$),
239, 240

San Luis Obispo County's comments recommended the deletion of the following tracts for the reasons indicated.

<u>Tract</u>	<u>Geohazard</u>
131, 134, 138, 143, 146, 147, 151 155, 161(E $\frac{1}{2}$), 168, 175, 189 196(E $\frac{1}{2}$), 203 156-159, 162-164, 185($\frac{1}{2}$), 192($\frac{1}{2}$)	Hosgri Fault Zone Active subsea slump or landslide zones.

It was also recommended that the geohazards stipulation in the DEIS be revised to require studies to identify certain geohazards, to require surveys along the entire route of any pipelines to be constructed, and to require an assessment of alternative pipeline routes to determine the route that best minimizes geological hazards.

Commentors: State of California, Department of Conservation
San Luis Obispo County
AMBAG
Natural Resources Defense Council
Santa Cruz County
EPA

Response:

Comments indicate submarine canyons and channels, high angle slopes, buried channels and irregular seafloor are not examined. Submarine canyons, channels and steep (greater than 10°) slopes have been analyzed by the United States Geological Survey (III A.1.a.iii) and cited for stipulation (I.B.6.c). Additionally, tracts identified as having these potential hazards have been considered within the geohazard deletion alternative (II.B.11). Simple seafloor irregularities (other than canyons and steep slopes) have been considered as a possible constraint to OCS development, but not significant enough to warrant analysis within the limited confines of this document.

EPA and other commentors state that there is no analysis of impacts of a geologic nature on platforms, pipelines, etc. Discussion has been added to Section III.A.1.a.iii which considers the effect of fault movement, earthquake shaking, mass movement and seismic sea waves on oil exploration and development activities. Additionally, a new Section, I.B.7.h ("Structural Verification Program") has been added to the EIS which describes some procedures designed to prevent structural failures on the OCS in the face of seismic activity.

Basin by basin detailed hazards studies were requested by commentors. The geohazard discussion Section III.A.1.a.iii now includes detailed, tract specific analysis of all geologic hazards together with tract specific stipulation recommendations from the U.S. Geological Survey (I.B.6.c.) and a tract specific geohazard deletion alternative (II.B.11).

Comment indicates that FEIS should refer to source of data, used to reach conclusions regarding geohazard analysis. Introduction to Section III. A.1.a.iii indicates the source of most geohazard information as Field, et al., McCulloch, et al., and Richmond, et al. Their reports are soon to be released U.S. Geological Survey open file reports. All original data utilized by Richmond, et al., is available for public inspection at the office of the Oil and Gas Supervisor, U.S. Geological Survey, 1340 W. 6th St., Room 160, Los Angeles, Calif. 90017. The complete or partial set can be purchased from NOAA/EDS National Geophysical and Solar Terrestrial Data Center in Boulder, Colorado.

Comments from the State of California and others indicate that U.S.G.S. studies and analysis were not complete in time to be used in the DEIS and there is no explanation how geohazards information will be used in ongoing phases of project. Studies funded by BLM and carried out by U.S. Geological Survey (Geologic Division) were completed in Fall 1979 and preliminary results were incorporated into the DEIS. Final analyses of that study as well as additional field surveys and interpretations carried out independently by U.S. Geological Survey (Conservation Division) have now been completed and are incorporated in the FEIS. These data will be further utilized in developing the secretarial issues document as well as final recommendations by U.S. Geological Survey on the subject of stipulation and deletion recommendations. Information may be used by the Deputy Conservation Manager for resource evaluation as well. When and if tracts are actually leased, geohazard information will be used (together with any subsequently acquired data) to access platform, pipeline, and drilling permitting and approval.

Comments recommended a revised geohazard stipulation which require studies, surveys and assessment of procedures which minimize geologic hazards.

The stipulations have been revised, they now address three different geologic hazards: mass movement, faulting, and submarine canyons. The stipulations are sufficiently flexible to allow the Deputy Conservation Manager to require whatever studies or surveys he deems necessary to assure environmentally safe OCS development. Additionally, further guidelines for safe conduct of OCS oil and gas activities will be provided by OCS Orders and the Structural Verification program. The revised stipulation now also requires soils and engineering studies to be completed before tract development or exploration proceeds.

Tract deletion recommendations were developed by the State of California and San Luis Obispo County. These recommendations were taken under consideration and a tract deletion alternative was developed and appears as Section II.B.11. Many of the tracts identified by the State and San Luis Obispo County are included within this alternative. Some tract deletions differ from those recommended due to the availability of new data which relocated hazards identified in Visual 10. (Visual 10 should not be used for tract specific interpretation due to its preliminary nature and scale limitations.)

Issue #15: Conflicts with Transportation

A number of comments indicated that activities resulting from this proposed OCS Sale may cause significant conflicts with shipping in the area. Concern was expressed that a Traffic Separation Scheme (TSS) should be established for the area by the U.S. Coast Guard, prior to proceeding with the proposed sale. The establishment of a TSS would impose certain restrictions on operators of leases within or within a certain distance of the shipping lanes. The issuance of oil and gas leases prior to the establishment of the TSS may preclude selection of the safest, most economical shipping lanes.

Tract deletion option alternatives to the proposal were recommended for two basins. The Pacific Merchant Shipping Association recommended the deletion of 15 entire tracts and 7 partial tracts in the Santa Cruz basin.

San Luis Obispo County recommended the deletion of 24 entire tracts and 4 partial tracts in the Santa Maria basin. These tracts fell within presently-used shipping route which is one of the proposed TSS locations being considered by the U.S. Coast Guard.

The Coast Guard recommended inclusion in the DEIS of several other TSS under consideration for the PAR study and note that the proposed TSS in the DEIS may not be the final solution. Also, the Coast Guard suggested that mitigation stipulations address navigational safety.

The California Coastal Commission is concerned that petroleum development related vehicular traffic resulting from development of Point Arena tracts will impact the already heavy traffic characterizing California State Highway Route No. 1 in Mendocino County.

The Federal Energy Regulatory Commission points out errors in and provides additional information for sections of the EIS dealing with LNG facilities, pipelines, and oil and gas infrastructure. Several comments expressed concern that the DEIS does not discuss the impact of an oil spill on Pillar Point Harbor, Santaruz Harbor, Morro Bay Harbor and Port San Luis.

Several comments expressed concern that the DEIS does not contain sufficient information on impacts of crew and supply boats on harbors.

EPA requested the rationale for selecting barging/tankering of oil over pipelines transportation.

List of Commentors: U.S. Coast Guard
Pacific Merchant Shipping Association
San Luis Obispo County
EPA
California Coastal Commission
Federal Energy Regulatory Commission

Response:

The Eleventh and Twelfth Coast Guard Districts are conducting the PAR study for those areas included in OCS Lease Sale No. 53. Study results and routing proposals will be published January 1, 1981. It is unlikely that the routing measures resulting from the study will be established prior to the May, 1981 lease sale.

The Coast Guard's comment on consideration of other TSS alternatives is added to Section III. B.5.a. BLM has considered the need for stipulations addressing navigational safety 564 chooses not to develop one at the present time.

Section IV. B.8.d. addresses the issue of heavy traffic volumes along Route No. 1 in Mendocino County during summer season and suggests that pipeline construction should be conducted during the off seasons (fall, winter and spring) when the traffic volumes are lower.

Federal Energy Regulatory Commission's comments on description of existing onshore gas lines are included in Section III.B.5.c. An expanded discussion of oil spill impacts on harbors is included in Section IV.B.8.b.

Additional information on impacts of crew and supply boats on harbors is included in Section IV.A.2.a.

Barge and tankers were selected over pipelines for the conceptual transportation scenarios for the following reasons:

- 1) Bodega - Economically preferable because of low crude production.
- 2) Point Arena - Economically and environmentally preferable because of the location of Point Arena to the refineries in San Francisco Bay area.
- 3) POCS Reference Paper No. 53-1, Proposed Oil and Gas Transportation Scenarios of Proposed OCS Sale No. 53 Offshore Central and Northern California was reviewed by the local governments and oil companies prior to DEIS Sale No. 53.

Issue #16: Cultural Resources

Comments were received regarding the analysis of potential impacts of the proposal on cultural resources and on measures to mitigate potential impacts.

Some comments suggested that the DEIS does not sufficiently identify the cultural resources in the proposed sale area (archaeological and historical sites, sites or areas of importance to Native Americans), and evaluate their significance. Concern was expressed that not enough studies were done prior to preparation of the DEIS and that consultation with Native Americans was not sufficiently extensive. The Native American Heritage Commission objected to the "scientific bias" of the DEIS.

Commentors expressed disagreement with conclusions in the DEIS regarding impacts or cultural resources and suggested further analysis of some potential impacts. For example, disagreement was expressed with the conclusion that impacts to some cultural resources would be slight or negligible. Concern was expressed for the possible impacts on areas of spiritual importance to Native Americans.

Some comments received recommended that additional mitigatory measures be discussed and that the proposed cultural resource stipulation is inadequate. The State Historic Preservation Office recommended that an extensive study of cultural resources in the area be conducted leading to the development of specific recommendations to mitigate potential impacts, avoid impacts, and monitor effectiveness of mitigating measures.

Some comments recommended delay of the sale to allow impact analysis and stronger mitigation measures (especially regarding salmon fisheries) in the Eel River Basin so that the secretary's trust responsibilities to Native Americans can be better served.

Commentors: Western Oil and Gas Association
Native American Heritage Commission
BLM, Bakersfield
California State Preservation Office
Advisory Council on Historic Preservation

Response:

Extensive consultation has been conducted with the California Office of Historic Preservation and with the Native American community. All individuals referred to BLM by the California Native American Heritage Commission (NAHC) were consulted prior to preparation of the DEIS. In addition to receiving the DEIS, NAHC was notified of the repositories for additional copies of the document. Native American concerns and religious views are discussed in Sections III.B.7 and IV.B.7.

BLM contracted with Winzler and Kelly for an overview of historical and archaeological resources, which has been included in Vol. III of the report, "A Summary of Knowledge of the Central and Northern California Coastal Zone and Offshore Areas" (1977). Additional ethnological and

shipwreck studies were completed by BLM in-house in 1979. Results of all these studies have been incorporated in Section III.B.7.

All archaeological District Clearinghouses in proximity to the sale area have been consulted for updates of BLM's archaeological site records.

The Federal Register has been consulted for current listings on the National Register of Historic Sites. Potential impacts to these sites have been discussed in Section IV B.7.

Potential impacts on salmon fisheries are addressed in Section IV.B.5, though the absence of oil development in the Eel River Basin will probably preclude any effect on Native American salmon fisheries.

The following proposed alternatives would provide some measure of protection for cultural resources: 1,2,3,4,5,6,7,8,9,10,11. Alternatives 1, 2, & 5 would provide the highest degree of protection.

Regarding mitigating measures to protect cultural resources, a lease stipulation has been included in the proposal to require remote sensing surveys of those tracts considered most sensitive for marine cultural resources. This stipulation has been used in previous OCS lease sales and has been developed by various agencies within the Department of the Interior including BLM, USGS, the National Park Service and the Heritage Conservation and Recreation Service.

The process for approval of exploration and development and production plans provides ample opportunity for mitigation of potential onshore impacts to cultural resources from OCS related development. State agencies and Federal agencies are afforded the opportunity to review these plans prior to their approval, allowing the identification of potential effects to cultural resources. Mitigation of these impacts at this stage of the process is more practical since only at this point are site specific development plans known and specific potential impacts readily identified. Depending on the nature and location of cultural resources likely to be impacted, pertinent Federal, State, or local controls may be used to insure that these resources are protected.

Issue #17 Establish a Petroleum Reserve

Some commentors recommended all or portions of the Sale 53 area be placed in a petroleum reserve following the conduct of a Federal exploration program to determine the location and amount of petroleum resources in the area.

Commentors: San Luis Obispo County and others.

Response: The environmental effects of establishing a National Petroleum Reserve in the proposed Sale #53 area have not been given separate consideration in the FEIS. In giving final approval to the 5-Year OCS Leasing Schedule, the Secretary determined that proposed Sale #53 is an integral part of this program to help meet U.S. energy needs pursuant to the 1978 OCS Lands Act Amendments, the National Energy Plan, and as set forth in DOE's OCS production goals for 1985, 1990, and 1995. However, the area could be set aside as a National Petroleum Reserve. A government-sponsored exploration program could be initiated under the OCS Lands Act, as amended, 43 U.S.C. Section 1340 (a)(1), in which case the environmental impacts would be related to the level and kind of exploration activity permitted in the reserve.

Agencies and Organizations Who Have
Submitted Written Comments

ABAG, Monterey

Advisory Council on Historic Preservation

Air Castle, The

Air Resources Board

American Cetacean Society

Arizona Highway Users Conference

Atlantic Richfield Co.

Bureau of Land Management, Bakersfield

Bureau of Mines

C.O.A.A.S.T.

Cal Poly State University

California Native Plant Society

California, State of Air Resources Board

California, State of Office of Planning & Research

California, State of Resources Agency - Historic Preservation

Capitola, City of

City of Carmel-by-the-Sea

City of Grover City

City of Pacific Grove

Committee for Green Foothills

Conservation Natural Resources

Council on Environmental Quality (CEQ)

Country Women

Department of the Air Force

Department of the Army

Edwin K. Williams & Co.

Environmental Center of San Luis Obispo County

Exxon Company

Far West Nursery

Far West Ski Association

Federal Energy Regulatory Commission

Friends of the Coast

Friends of the Sea Otter

Fund for Animals, Inc.

Heritage Conservation & Recreation Service

Humboldt County

Integrated Forest Management, Inc.

League of Women's Voters

Louisiana Pacific Corps

Marathon Oil Company

Marin Conservation League

Marin County Board of Supervisors

Marin County Comprehensive Planning Department

Mendocino County

Miller, Gary N.

National Park Service

Native American Heritage Commission

Natural Resources Defense Council, Inc.

Net Energy

Nevada Highway Users Conference

New York OCS Office, BLM

North Central Coast Regional Commission

Offshore Oil Development

Pacific Coast Properties, Inc.

Pacific Fishery Management Council

Petaluma Cubscout Pack 1, Den 1

Pismo Beach, City of Wayne Hoereth

Port San Luis Harbor District

Salmon Trollers Marketing Association, Inc.

San Francisco Bay Conservation & Development Commission

San Francisco, Board of Supervisors

San Luis Obispo County, Air Pollution Control District

San Luis Obispo County Area, County of Governments

San Luis Obispo County, Board of Supervisors

San Mateo County

San Mateo County, Department of Environmental Management

San Mateo County Regulatory Planning Committee

Santa Barbara County

Santa Cruz Commercial Fishermen Marketing Association

Santa Cruz County

Santa Cruz County Energy Action

Save Our Shores

Sierra Club

Southern California Gas Company, Los Angeles

Union, The

University of Southern California

U.S. Coast Guard

U.S. Department of Commerce

U.S. Fish & Wildlife Service

U.S. Geological Survey

Utah Highway User's Conference

Washington, State of - Department of Ecology

Western Environmental Trade Association (WETA)

Wildlife Society, The

Private Citizens Who Have
Submitted Written Comments

Allen, Caroline E.
Allen, Francine J.
Asher, Stewart and Julie
Austin, Carol
Azevedo, John and Shawn
Azevedo, Kenneth
Bacon, Marion
Baker, Ron
Balding, George
Bates, Zelpha
Becklin-Norris, Donna
Bell, Richard M.
Blankenship, David
Boudart, Vinciane
Boyd, Milton J., Ph.D.
Brittner, Gary
Broadhead, Clare A.
Burness, Bob and Judith
Burt, Lori
Butler, Brendaw
Bott, Julia
Calhoun, Cornelia
Cargill, Aline
Chase, Don M.
Chouteau, Alice, Douglas,
Garth, and Zach

Christianson, John V.
Cirino, Leonard
Clayton, Mary A.
Coffeen, Mary
Cole, Christopher
Crone, Martha
Crood
Crowder, Elizabeth S.
Cutler, Cecile
De Muri, Nancy
Denneen, William
Dewey, Barbara
Domingo, Lisa
Duffy, Allen
Duncan, Susan
Edwards, Louise
Engman, Robert
Enke, Fern
Emucci, Rick
Fahsing, Daphne
Fannin, William J.
Farmer, Frank R.
Flatt, John R., Mrs.
Floore, Susan
Ford, Linda and Jim

Freeman, Kendrick	Holland, Adam
Friend, Pebbles	Holmgren, Rod
Froelick, Deborah	Hoover, Freda and Ferris
Gentry, Chris	Ihara, Nancy
Gesner, William	Jacobsen, Tineke, Mrs.
Glantz, Bonnie	Jennings, Larry
Graham, Jane	Jones, Harvey N.
Grant, Cynthia	Kerry, Theodora
Greenleaf, Anna	Killion, Tom
Gropman, Charles	Kinzie, Robert A. Jr.
Grossman, Marjorie	Kobus, Joseph D.
Haines, Jean N.	Korones, Meg
Hamm, Jeff	Kouzen, Marguerite
Hamner, Nikki	La Pez, Jean C.
Hancotte, Dennis	La Vae, Kenneth
Harlow, M.	Lassiter, Nicole
Harms, John and Bobbie	Leader, David
Harms, Marlin	Leader
Harper, Lisa	Kouzen, Marguerite
Harrington, Rae	Lewis, V. M., Mrs.
Harris, Nancy R.	Lilly, Jeanne W.
Hartwell, Robyn D.	Livezey, Robert
Heckerorth, J. L.	Lockwood, Marian
Heintz, Dana	Long, Gordon A.
Heintz, David	Louchard, William

Luna, Andrea
MacDonald, Diane
Martin, Henry
Mashburn, Charleen
Maue, Kenneth
Maxim, Robert
McKay, Jackie
McLean, Kim
McSayre, George
Meagher, Glenn B.
Miller, Gary N.
Mitchell, Anne
Mitchell, Marie
Mohr, John Luther
Monaghan, Lois
Montizambert, Eric A.
Moore, Nancy
Moore, S. Dixon
Nagy, Verna
Naylor, Vasseur
Neill, J. M.
Nelson-Rose, Jeff
Neubert, Joe
Neyhart, Barbara, M.D.
Neyhart, Debby

Nickell, Margit
Nyeholt, Marie
O'Hagan, Joseph
Olmstead, Alan
O'Neill, Karen
Otter, Lee W.
Payne, C. Robert
Pehrson, Robert C., Mr. & Mrs.
Pier, Jade
Pine, Josh
Potashin, Richard
Price, James S.
Puffer, C. J., Mr. & Mrs.
Reber, Sheldon
Reichenberg, Stanley, M.D.
Reese, R.
Reiss, Arlene
Rich, David
Robbe, D. and T.
Rohlfes, Elaine
Ruddell, Roy M.
Sampson, D. S.
Sanner, Jude
Schapiro, Erik

Schomer, Christine

Scott, Herb

Smith, Clayton

Smith, Marilyn

Snyder, Marcia

Solis, Alida N.

Sparkuhl, Marielle

St. Clair, Margaret and
Eric

St. John, Laura

Stern, Robert, Mr.

Stevens, Sally

Summers, Judith

Sutherland, Robert

Sweet, Sue C.

Thayer, Gail

Troup, David

Van der Zache, Irene

Vast, Carl

Walker, Valerie and
William

Warren, Bonnie

Weir, C. J. Jr.

Wells, Bill

Wheeler, Dennis Jr.

Willard, Mary B.

Williams, Corrine

Winkler, Mark

Winter, Brian

Woelfel, Bob

Wong, Sophia

Woodhouse, Mary E.

Yount, Mary and Anne

Zeklin, Allen

6. REPRESENTATIVE LETTERS RECEIVED FROM FEDERAL, STATE AND LOCAL GOVERNMENTS

ALL INFORMATION CONTAINED
HEREIN IS UNCLASSIFIED
DATE 10/15/01 BY 60322
UCBAW/STP



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS WESTERN SPACE AND MISSILE CENTER (AFSC)
VANDENBERG AIR FORCE BASE, CALIFORNIA 93437



REPLY TO
ATTN OF: SEY

5 MAY 1980

SUBJECT: Comments on DEIS for OCS Sale No. 53

TO: Pacific Outer Continental Shelf Office
Bureau of Land Management
1340 W. Sixth St. Room 200
Los Angeles, CA 90017

Attn: Mr. Tom Cooke

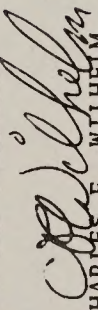
1. We have completed a review of the Draft Environmental Impact Statement for OCS Sale No. 53 and have only one minor correction to offer:

On page 1-65 (two places) and page 3-142 change
Space and Missile Test Center (SAMTEC) to read
Western Space and Missile Center (WSMC).

2. We are performing a continuing hazard analysis of the MX missile as developmental information becomes available. Currently available data does not indicate a requirement for expanded safety areas extending more than 3 miles from the shoreline. We will keep your office apprised of future developments that could be cause for deletion of any tracts from OCS Sale No. 53.

3. Further coordination on these matters should be directed to WSMC/SEY, Mr. Abbott, extension 866-3602.

FOR THE COMMANDER


CHARLES F. WILHELM, Colonel, USAF
Director of Safety



AIR POLLUTION CONTROL DISTRICT
COUNTY OF HUMBOLDT
3600 SOUTH BROADWAY EUREKA, CALIFORNIA 95501
PHONE (707) 443-3093
May 22, 1980

Mr. William E. Grant
Bureau of Land Management
Pacific OCS Office
1340 W. Sixth St., Room 200
Los Angeles, CA 90017

Dear Mr. Grant:

RE: DEIS OCS Sale No. 53

We have received the draft EIS for the OCS Sale No. 53 and offer the following comments:

- 1) Table IV. B.1. a-1 indicates no data for the Eel River Zone for annual average onshore concentrations. The 1979 annual geometric mean for TSP at the state and local Air Monitoring Station (SLAMS) in Eureka was 45 micrograms per cubic meter. This value is well under the state and federal AAQS for TSP. NO₂ data for the same station in 1972 and 1973 was 33 micrograms per cubic meter-well under the federal AAQS.
- 2) Table IV. B.1. a-2 indicates B(62/68) for the Eel River Zone for 24-hr. TSP. This data has been checked against all 24-hr. TSP data since 1976 for local monitoring sites and cannot be verified. The Eureka SLAMS Station for 1979 out of 61, 24-hr. samples had one sample higher than the California 24-hr. AAQS. No samples were higher than the national 24-hr. secondary standard. The value of 105 micrograms per cubic meter was obtained on September 12, 1979.

Please correct the above tables with the correct data indicated herein.

Robert R. Selfridge
Air Pollution Control Director

By Robert W. Clark
Robert W. Clark, Deputy
Air Pollution Control Officer

RWC:pch

cc: Tom Hofweber, OCS Planner



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
800 Truxtun Avenue, Room 311
Bakersfield, California 93301
Phone: (805) 861-4191

Office hours: 7:30 a.m. to 4:00 p.m. weekdays

United States Department of the Interior
Bureau of Land Management
Pacific Outer Continental Shelf Office
1340 W. Sixth Street, Room 200
Los Angeles, CA 90017
Attention: John Lane

Dear Mr. Lane:

Thank you for the opportunity to review the "Draft Environmental Impact Statement on the Proposed 1981 Outer Continental Shelf Oil and Gas Lease Sale Offshore Central and Northern California: OCS Sale No. 53."

Our staff has reviewed the document and offer the following comments for your consideration:

Page 1-62, para. 2,3: Please define in the EIS the minimal standards for a "qualified marine survey archaeologist."

Page 1-63, para. 1: Given the uncertainties of remote sensing for the purposes of establishing the existence of cultural resources offshore, what standards are used by the OCS Supervisor to verify the existence of cultural resources in a marine environment?

Page 1-72, para. 3: The DEIS does not specify the number of trained personnel that would be available in case of an oil spill, nor what numbers would be required of the lessees; what are those numbers? Where would a viable strike force be located and how would it be deployed in case of an emergency? This would appear to be of critical environmental concern in an emergency oil or gas discharge.

Page 2-3, para. 1: Why are not the lethal and sublethal effects that "formation water" will have on local biota known? Could not simulation models or data from comparable environmental conditions be utilized?

Page 2-11: The statement in paragraph 1 and those on page 4-176, para. 2, proclaim the significance of submerged prehistoric and historic sites. The existence of permanent pilings and well casings will obscure the ability to detect cultural resources by creating magnetic anomalies, however, the last paragraph implies that oil exploration will enhance our knowledge of cultural resources (see also p. 4-170); the obscuring

IN REPLY REF:
1793 OCS
(C-012.7)

JUN 30 1980

of data by magnetic anomalies created by remnant well casings would appear to cause an unmitigatable loss of cultural resource data, rather than allowing our knowledge of marine archaeology to increase through necessary mitigation. The only areas where our knowledge may be increased is along the shoreline, where mitigative archaeological investigations may be required. The potential for losing knowledge concerning submerged cultural resources through oil and gas development appears to greatly outweigh any potential for gaining information through cultural resources investigations, given state-of-the-art techniques of marine archaeology.

Page 2-17, lines 1-5: The visual intrusions on Point Monterera and Pidgeon Point lighthouses should be discussed on pages 2-7 and 2-11 under the alternative of holding the lease sales as proposed.

Page 3-13, para. 1: Why were in-depth geohazard studies not completed prior to releasing the DEIS, especially given the seismically active nature of the Pacific coast, as described on pp. 3-13 to 3-19? Such studies should provide highly significant input to any decision regarding the lease sale and subsequent development; for example, how did you construct valid oil spill simulation models (pp. 1-24; 3-148; 4-1 through 4-20) without such information? We recommend that complete analysis of geohazards be completed and the results integrated in the final EIS and in decisions concerning all tracts in lease sale no. 53.

Page 3-43, para. 1: The algal communities have been studied extensively by several researchers (e.g., Dawson, Abbot and Hollenberg, etc.). Algae are very important in the food chain, yet those communities were not examined; this data gap should be reevaluated.

Page 3-52, para. 2: Since whale migration data and the effect of lease tract development on whale migration patterns will not be available until the Final EIS, we recommend that the lease sales be delayed until the information is fully analyzed and integrated in the Final EIS; only then should a decision be made. If this is not possible a protective stipulation should be included to protect the whales in the event that the information shows that whales will be adversely impacted.

Page 4-173, para. 1: If you have no information concerning how many structures will be within the range of visibility of the historic lighthouses or the Mendocino Chinese Temple (p. 4-174), how can you state that the visual impacts are "expected to be slight to none"? With visibility along the coast as great as 13-20 miles, the visual impacts could indeed be significant and degrading to the environmental integrity of the historic cultural resources.

Page 4-178, lines 2-4: Given the data presented, we contend that some properties listed on or eligible to the National Register of Historic Places will be affected by the proposed action.

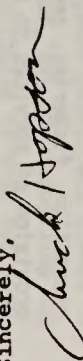
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AMERICA'S
ENERGY



Save Energy and You Serve America!

Page 4-178, last line: Where is the reference to the initial stipulations necessary for cultural resources? Are the stipulations those which are presented on pp. 1-63? There should be a discussion of compliance procedures under the National Historic Preservation Act of 1966 on 36 CFR 800. There should also be a discussion of coordination with the Office of Historic Preservation, the Keeper of the National Register, or the Advisory Council on Historic Preservation concerning Determinations of Eligibility, adverse impact avoidance, and possible mitigation measures. The stipulations, as written, do not appear to provide adequate assurances that significant cultural resource sites will be protected or adverse impacts adequately mitigated.

Sincerely,



Louis A. Boll
District Manager

cc: Jeffery Bingham, Office of
Historic Preservation



PLANNING DEPARTMENT

COUNTY OF SANTA CRUZ

GOVERNMENTAL CENTER

701 OCEAN STREET SANTA CRUZ, CALIFORNIA 95060

(408) 426-2191

KRIS SCHENK
Director

July 1, 1980

William E. Grant, Manager
Bureau of Land Management
1340 West Sixth Street, Room 200
Los Angeles, CA 90017

Dear Mr. Grant:

Enclosed are comments on the Draft Environmental Impact Statement on Proposed Lease Sale #53. The comments are separated into general areas of concern, and specific page by page comments.

Also enclosed is a copy of the comments submitted in response to the Preliminary DEIS. Thank you for your consideration of these comments, and my oral testimony, in your development of the Final Environmental Impact Statement on Proposed Lease Sale #53.

Santa Cruz County Board of Supervisors unanimously passed the enclosed resolution regarding the inadequacies of the DEIS. It is essential that the Final Environmental Impact Statement more accurately address potential local impacts from proposed offshore oil and gas extraction.

Sincerely,

Mary Ann Johnson

Mary Ann Johnson
Associate Planner
Coastal Energy Impact Program

MAJ:mg

Encl.

GENERAL COMMENTS

The general comments fall into five areas of concern:

- Evaluation of the value of local resources risked by oil development is omitted.
- Environmental studies are not complete.
- Inappropriate models, with inadequate data inputs, are used.
- No objective framework for evaluating significance of impacts exists.
- Alternatives to oil and gas are not considered.

Value of Local Resources

The DEIS is seriously inadequate in its evaluation of the value of local resources which will be risked by development of oil and gas in Lease Sale #53. Dollar estimates for losses in the following areas need to be developed: recreation, fisheries, and research activities. Costs associated with the provision of services to OCS related development should be quantified. The value of our priceless resources threatened should be emphasized: the quality of life in a pristine area, the rare and endangered species, the views along the coastline, and the sensitive coastal eco-system.

Environmental Studies

The fact that the environmental studies associated with the environmental assessment of OCS #53 are not completed challenges the validity of the analysis in two ways. First, the inputs for the models used to predict the probabilities that resources are impacted are unavailable. Second, the data on resources impacted is not available. This data is especially critical in a frontier area.

Models Used in the Analysis

Throughout the DEIS impacts are evaluated based on the results generated by models. The constraints to the use of these models, inadequate data inputs, inaccuracies associated aggregation, skewed results created through generalizations, etc., are not presented as qualifications on the use of the output from the models.

Evaluation of Impacts

In every section the methodology used for evaluating the significance of impacts should be clearly outlined. An impact could be insignificant when generalized over a large area and viewed statistically by an analyst, yet register as extremely significant in an absolute sense for those impacted.

Alternatives

The mandates of NEPA have not been met in the DEIS dismissal of alternatives to the development of oil and gas resources. The willingness of the people of Santa Cruz County, and people throughout California, to adjust to use of renewable resources as an alternative to risking our sensitive and spectacular coastline was overwhelmingly demonstrated at the Public Hearings on Lease Sale #53.

SPECIFIC COMMENTS

P. 1-72 "Mitigating Actions"

While the programs described under mitigating actions may partially compensate the people of Santa Cruz County in the event of an oil spill, the long-term loss of priceless views and the experiences offered by a pristine natural eco-system cannot be repaid, and should be recognized in the DEIS.

Alternatives

P. 2-1 "Hold the sale as proposed"

The description of the "hold the sale as proposed" alternative is described as though the risked conditional mean amount of resource is discovered. Impacts will vary over a range, dependent on the resources recoverable, and the description of this alternative should cover a range of impacts.

P. 2-2

Air quality analysis should be based on a "worst case" scenario. In this instance, the high resource find should have been the basis of predicted impacts on air quality.

In areas where communities have worked hard to attain air quality levels, OCS development and associated air quality degradation would preempt the location of other types of industrial activity which could be more beneficial to the community in terms of jobs and investment.

Affected Environment

P. 3-66 Table III.B.1-1 is inaccurate. Santa Cruz County has 11 State Parks in the Coastal Zone - a considerable acreage devoted to recreational use.

P. 3-68 Table III.B.1-3 is inaccurate. Residential and commercial acreage for Santa Cruz County should be included.

P. 3-130 The relevance of this diagram to the environmental impacts of proposed oil and gas development is questionable.

P. 3-152 This section should include the development pressures resulting from the growing commuter population living in Santa Cruz County and working in the San Jose area.

P. 3-157 As noted in the comments on the PDEIS, the possibility of expanding Santa Cruz Harbor is extremely limited.

Significant Impact Producing Agents

P. 4-11 "The risk of a spill occurring should Sale No. 53 proceed should be reduced as local oil would be transported in American ships..."

Does this statement take into account the increase in navigational hazards as a result of Sale No. 53?

P. 4-30 "Water Quality"

With respect to water quality, please consider the verbal testimony (also communicated in writing) of John Ricker, watershed analyst and hydrologist for Santa Cruz County.

P. 4-52 "Changes in Socio-Economic Activity"

Information in this section was generated by use of the Curtis Harris economic model. As with all econometric models, there are constraints to the use of this model. It is especially inappropriate for use in an area that varies significantly from the national mean in that the model is based on nationwide data. California, with its history of rapid growth and development, is not similar to other parts of the country where change has been more moderate. Specifically, the following problems are associated with the use of the Curtis Harris model.

1. Standard errors and confidence levels are not given so that the data output can be meaningfully interpreted.

2. Predicting for a specific region from nationwide data only makes sense when the region falls close to the mean of the predictive data. There will likely be a large prediction error with any California county because

of the rapid growth of this area. This explains the extreme disparity between local predictions and the predictions generated by the model. For example, the model predicts a 1990 population of 112,483 for Santa Cruz. To achieve that prediction, the County would have to lose a population of 63,017 over the next ten years. This kind of counter-intuitive output destroyed the credibility of the other model outputs. The reference paper, "Onshore Economic Impact Analysis" states: "The methodology used and rigor to the way in which socio-economic impacts have been assessed in the past." It appears that "rigor" has been added at the expense of common sense. A reevaluation of the problems in the use of this model indicate that locally generated data would provide a more reasonable basis for an analysis of the socio-economic impacts. The reference paper suggests that analysts should go beyond the output from the Curtis Harris model to a more disaggregated approach, "allowing more detailed analysis of potential impacts." This has not happened.

3. How current are the parameter estimates? This information is noticeably absent from the reference paper.

4. The unit of observation is the county with the Curtis Harris model. County boundaries are frequently not the appropriate divisions for a meaningful economic region.

5. The Curtis Harris model is a recursive model which has been criticized as being incorrectly estimated. A simultaneous equation bias results for correlation across disturbances. Two stage least squares estimation techniques would correct this.

6. What is the history of the model's accuracy? See: "Economic and Fiscal Impacts of Coal Development" Krutilla and Fisher, Resources for the Future.

P. 4-59

Transportation Scenario 1A calls for 13 acres for oil and gas processing plant and two 50,000 barrel oil storage tanks associated with the Santa Cruz Basin. The report states that the plants will be located "2 miles inland along the No. 1 pipeline route." The No. 1 pipeline route is not labelled on any of the accompanying maps.

P. 4-82

Probable Impact of the Proposed Action

"The acute effects of OCS activities in the marine environment, except for immediately around the platforms should not be significant. However, long-term chronic impacts are unknown at this time."

In many places in the DEIS unknown effects are assumed to be insignificant. This sort of assumption indicates the biases of the authors of the document.

"Fate and Effects of Hydrocarbons on Marine Eco-Systems and Organisms,"

Ed. Doug Wolf, Pergamon Press, 1977, addresses the long-term impacts of hydrocarbons in the marine environment. Has the material presented at this symposium been considered?

PP. 4-184
to 4-121

"Impacts on Marine and Coastal Eco-Systems"

Throughout this section impacts are tied to probabilities of the number and location of oil spills. Because oil spill probabilities are generated from a model which has incomplete data inputs, there should be less emphasis on whether or not it is likely, based on the oil spill model, that an oil spill will occur; and a greater emphasis on the extent of the damage should there be an oil spill in any given area.

PP. 4-122
to 4-135

"Impacts on Socio-Economic Systems"

Discussion of impacts in this section are generalized over a large enough area to justify prediction of minimal impacts: localized impacts in affected areas are not adequately considered. In each concluding statement there is a recognition of increased impacts in localized areas, but there is no analysis of what those impacts would be in a "particular community" nor any discussion

of which "particular communities" would be those impacted. For the people reviewing the DEIS, it was difficult to respond to the adequacy of the analysis of the impacts as there is little indication of where the impacts are occurring.

Typical of the prevalent analysis technique of generalizing impacts in order to dismiss their significance is the second paragraph on page 4-127. "Thus, while the direct and induced employment changes are rather high in an absolute sense for the 16 county coastal area and California as a whole, they are relatively minor when compared to total State employment." This could be compared to a statement declaring that the impact of wiping out the population of Washington D.C. would be relatively minor when compared to the population of the entire country. The relationship between California employment and OCS related employment is introduced in order to provide a disparity which makes the impact relatively insignificant. The actual issue is what level of direct and induced employment - how many new residents - will be locating in any given area; and what will be the impact in that particular area. In the areas where OCS onshore facilities are planned there should have been an analysis of the availability of housing, public services, land and infrastructure.

PP. 4-136
to 4-147

"Impact on Recreation and Sportfishing"

Page 4-138 discusses the impact of an oil spill on the economy of the Santa Cruz region. The DEIS terms the loss of 1.5 million visitors to the area a "serious effect." The local business people testifying at the OCS 53 hearing described the impacts of an oil spill as devastating to their businesses. The DEIS should have quantified the loss of 1.5 million visitors by using projected visitor expenditures and provide a more objective prediction of losses to the Santa Cruz economy.

Again, the analysis is based on predictions generated by a combination of the Curtis Harris model and the oil spill model. The legitimacy of the conclusions that there will be no significant impacts on recreation and sport fishing should be qualified by the constraints associated with the

P. 4-184

"Impacts on Land Use"

On page 4-184: "These constraints (the availability of water for industrial and residential use and the lack of excess sewerage capacity) are a result of present growth management policies in specific areas." This statement reflects the lack of recognition in the DEIS of the physical constraints to development in many coastal areas. Growth management policies are aimed at managing new development such that already strained public facility capacities are not exceeded. The constraints are not a result of growth management policies, the growth management policies were developed in response to physical constraints. For example, in certain parts of Santa Cruz County, the planning commission has already denied building permits because of the uncertainty surrounding water availability.

Had a reasonable population projection been used, the statement on page 4-187, "due to the negligible increase in population....it is not expected that the coastal areas will experience significant strain associated with uncontrolled growth," might have been changed to more accurately reflect the real constraints to continued development facing many coastal areas including Santa Cruz County. While the DEIS projects a 1990 population of 112,483 for Santa Cruz County, the Association of Monterey Bay Area Governments projects a 1990 population of 211,700. 99,217 people will create competition for limited availability of services.

P. 4-195

"Irreversible/Irretrievable Commitment of Resources"

In addition to the mineral resources extracted from the Lease Sale 53 tracts, there would be an irreversible and irretrievable commitment of fossil fuel resources associated with the development and extraction activities.

P. 4-201

The summary paragraph for the "Probable Impacts of the Proposed Action"

section is misleading. Throughout this section long-term impacts are identified and discussed. Instead of summarizing these vital considerations, this paragraph alludes to "few long-term productivity or environmental gains." What are these few long-term gains? The bias that pervades this document is blatant in this alleged summary.

use of these models. Additionally, the assumption that oil spills containing shore will be mitigated by oil spill containment procedures should be accompanied by a statement that state of the art oil spill containment technology is ineffective at sea levels commonly occurring in the lease sale area.

pp. 4-148 to 4-159 "Impacts on Commercial Fisheries"

An analysis of the economic impact of oil spills on commercial fisheries is attempted on page 4-153. The cost to fisheries of the oil spill in Santa Barbara is varied by the predicted number of spills in each area in Lease Sale #53. The obvious error in this sort of comparison is that fishery resources in these areas vary. This can be compared to an analysis of tornado damage. If two tornados in Kansas caused \$50,000 of damage, and one tornado is predicted for San Francisco, then this methodology would generate an estimate \$25,000 of damages from the tornado in San Francisco.

Instead of including all fishery resources in the lease sale area in the calculation of the significance of impacts, the DEIS considers only the fishery resources in areas that have greater than 5% probability of being hit by a spill. The probability is generated by the oil spill risk model. Because of the fallibility of this model, it is essential that all resources be evaluated for potential losses in the event of a spill.

pp. 4-167 to 4-194

"Impacts on Archaeological and Cultural Resources"

The inclusion of "spiritual intrusion" as an impact category is an important recognition of a cultural resource. It is difficult to imagine, however, that an analyst can determine the significance of the degradation of spiritual quality. For example, is it a "small" impact on the worshippers of the Mendocino Chinese Temple if only several of the souls of the congregation of the Temple don't make it back to China? What is a significant number of souls?

GENERAL COMMENTS ON PRELIMINARY DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR OCS LEASE SALE #53

In analysis of output from the models, low probability results are dismissed. Because of the fallibility of both the models and inputs, the impacts of low probability events require consideration. When model outputs are contrary to projections based on locally produced data the discrepancies should be addressed.

Throughout the report it is difficult to determine specific local impacts resulting from OCS #53. When impacts are projected for an area, frequently there is no correlation with projections and data sources existing at the local level.

USGS used a probably price/barrel of oil of \$14.51 in their development of scenarios for the PDES. If a realistic price assumption were made, it is likely that a considerably higher number of wells and extraction related activity would become economically feasible. An increase in extraction activity would magnify the impacts discussed in the PDES. If determination of the "significance" of an impact is correlated with the magnitude of the impact, then many of the impacts described as "insignificant" could achieve "significance" as a result of more accurate development scenarios. The development scenarios should be updated with the use of more timely price assumptions.

A similar problem exists with the assumption of a price/barrel of \$27.50 used in developing the socio-economic impacts. This is the low estimate used by DOE for a 20 year projection, with a most probably price of \$43.00/barrel and a high of \$60.00/barrel (1977 dollars.) Electric Power Research Institute is using even higher projections.

The effect of using an unrealistically low price assumption is described above. More realistic price assumptions could provide an entirely different picture of the impacts on Santa Cruz County.

The link between the presentation of data and the determination of the significance of impacts is weak throughout the report.

- A. Assumptions are not clearly set out in each subject area.
- B. Descriptive data could be referenced, providing more space within the page limitation for analysis.
- C. The criteria used for determining significance are not discussed.

The lack of data relating to the long term impacts of chronic oil pollution in a frontier area is a concern that has been raised. The PDES should respond to this as well as other data gaps; for example, the lack of data on seismic profiling.

For people who have been following the lease sale process, the disparity between data presented in the Five Year DES and the PDES causes concern. For example, the Five Year DES predicts 4 oil spills of greater than 1000 barrels, while the PDES projects 2.29 spills.

SPECIFIC COMMENTS

- | | |
|---------|--|
| p. 1-17 | How were the assumptions about refineries made, i.e. that there will be new refineries, that they will be retrofitted, that capacity will be 1.6%? |
| p. 1-19 | The assumption that offshore oil is the selected alternative for supplying energy should be spelled out rather than including an inadequate discussion of alternatives.
The usefulness of cost benefit analysis is in comparing the offshore oil alternative with other alternatives. Since the offshore oil alternative is assumed, the cost-benefit analysis loses its value. |

Problems:

- | | |
|---------|--|
| p. 1-28 | 1) Why was 10% used as a discount rate? |
| | 2) Complete internalization of externalities through regulation seems unlikely. What about the cost of regulation? |
| p. 1-30 | 3) The assumption of no significant changes in cost and pricing relationships seems unrealistic. This is contradicted by the discussion of alternative energy sources in DEIS 5 year plan, p.25. |

Geohazard Stipulation

The stipulation to avoid potentially unstable portions of the lease sale block will be difficult to fulfill in the Outer Santa Cruz Basin where, according to the descriptive section, there is, at this time, insufficient data to establish the presence of absence of slumps or slides. The results of the additional studies must be known before the development of any mitigating stipulations. There is also, no specific mention of seismic hazards in the stipulation, a serious omission in an area with numerous active faults and a long history of seismic activity. The discussion of possible engineering solutions to the geological hazards in this lease block are not adequate assurance that the environment can be protected in the very likely event of fault movements and mass movements of sediments.

p. 1-144

7-52

Marine and Coastal Eco System

- p. 2-5 1) Does the statement: "The 2.29 spills should not result in serious impacts..." agree with data presented? What are the criteria for 'serious impacts'? See p. 4-68 referring to the sea otter as "Extremely vulnerable..."

Socio Economic

- p.2-6 1) There is no tie between the "Socio-Economic" section and the "Recreation" section. The impacts of oil development activity will detract from the effectiveness of these coastal areas as visitor serving economies.
- 2) "The analysis indicates that there would be little in the way of infrastructure stresses" p.3-156..."Santa Cruz Harbor would undergo limited expansion..."

There are currently no plans for the expansion of Santa Cruz Harbor. Inland expansion is prohibited by protected wetlands. Oceanward expansion would be prohibitively expensive, as well as exacerbating the littoral drift and downshore erosion problems. The harbor channel is already at capacity evenings and weekends.

p. 2-7

In what way will local and regional zoning/planning requirements further minimize dislocations?

Recreation

p. 2-7

Can it be determined with certainty that all spills will weather before contacting shore? Is sufficient data on winds and ocean currents available? This section does not do justice to the major role the visitor serving sector including recreation facilities, plays in the Santa Cruz economy. It should be expanded.

Commercial Fishing

p. 2-9

This analysis could be improved by making an accurate estimate of the commercial fishing resource value of the areas being analyzed, rather than using the figures from Santa Barbara. Also, dollar values should be adjusted for inflation.

p. 3-61

Table III. B. 1-1. The accuracy of this data is questionable. Many acres of land in the Santa Cruz County Coastal Zone are devoted to recreational uses.

p. 3-63

Table III. B. 1-3 Coastal Zone should be defined. Attached is Table 18 from Santa Cruz County "Growth Trends Report" which contains more complete data.

p.3-74

The paragraph describing the Santa Cruz economy seems inadequate in light of the potential impacts of oil exploration on a recreation oriented economy. The "AMBAG Economic Base Study" and the Santa Cruz County "Economic Report" provide timely data which could supplement the information presented.

Several issues which are critical to a review of the Santa Cruz County economy were completely excluded in the PDES.

A. Growth Management Program. Santa Cruz County is currently implementing a growth management program which was mandated by public referendum. Growth is limited to Santa Cruz County's fair share of state growth, annually. The PDES projections do not account for the impacts of this program. Growth management will skew projections on employment and population based on either past trends in Santa Cruz County or past trends in similar counties without growth management.

B. Housing. The gap between housing costs and income available for housing has increased dramatically since 1970. Housing prices within the county have increased more rapidly and to a higher level than for the nation as a whole. ("Housing Report Growth Management Program: February 1978) Existing lack of housing, coupled with reduction of new housing through the growth management program, will be exacerbated by the increased demand generated by people associated with OCS #53. PDES should address this issue.

C. Local Coastal Program. California Coastal Act of 1976, Division 20, Article 3, "Recreation" requires that the County of Santa Cruz reserve coastal areas for visitor serving facilities. The impact of this external impetus for growth in the County's recreational industry should be considered.

Cultural Resources

If the 300 page limit is a consideration in limiting the land use, socio economic and recreational sections of the PDES, then a reduction in the detail of the Cultural Resources section is an alternative which would free up space for issues of critical concern to county governments.

p. 4-42

Employment

The employment associated with OCS 53 would be beneficial only if the unemployed in Santa Cruz County had skills which were employable by the lease holders.

How would the conflict between recreational activities and oil extraction activities affect employment?

The status of local government resources in a post Proposition 13 era should be addressed. The question is not whether "changes in economic activities would generate a temporary public fiscal deficit or surplus," but rather whether counties such as Santa Cruz, which is anticipating a \$4 1/2 million deficit, will have the resources to accommodate an influx of people demanding services. The current push for growth management indicates that the carrying capacity of this area is being approached.

An additional pressure for county resources will be demanded for infrastructure related to oil extraction activities. Not only is Santa Cruz a frontier area, the percentage of economic activities devoted to manufacturing is less than the state average.

Oregon State University scientist Richard Caldwell is researching effects of oil in marine fishes. "The more subtle, and perhaps more widespread effects of oil are those involving chronic exposure to petroleum hydrocarbon by organisms living in areas of continual oil inputs to marine waters. In such areas, lethal and sublethal effects, follow the absorption of toxic doses of the dissolved chemical components from oil." Ilas Caldwell's work been considered?

Socio-Economic Impacts

The projected reduction in the population and number of jobs in Santa Cruz County as a result of OCS activity is counter-intuitive. In, "Scenario of Exploration, Development and Production" (AMBAG), most

p.4-55

4-90

probable employment 1980-1985 was estimated at 335 employees. AMBAG's development scenario included fewer wells than the PDES scenario (p.1-22). Some discussion of the dissonance between the PDES projections and the projections of local agencies might make the data more understandable.

Recreation

This section predicts impacts based on employment increases, while the preceding socio-economic section predicted employment decreases.

Again, the statement that all spills will weather before contacting shore is questionable. Tar balls, in a pristine frontier area heavily dependent on visitor demand, will impact general beach use.

The conclusion of "minimal impact" on recreation is difficult to justify after the prior description of noise and visual degradation.

TABLE 18
Existing Land Use by Planning Area

Area	Res.	Comm.	Ind.	Transp./ Util.	Inst./ Pub. Ego.	O.S./ Rec.	Mt.	Vac.	Total
1. North Coast	126	5	272	1,731	1,483	7,669	1,883	34,347	47,516
2. Bunny Beach	76	0	0	2,302	24	35	1,010	23,221	26,770
3. San Lorenzo Valley	2,622	91	304	1,602	219	3,134	112	36,071	44,155
4. Skyline	565	10	0	426	62	955	741	22,801	25,902
5. Scotts Valley	1,785	109	146	817	2611	400	320	10,576	14,411
6. Santa Cruz	3,054	464	125	1,061	2,532	459	150	3,027	10,112
7. Capitola	1,049	126	27	3	36	70	39	224	1,590
8. Soquel	1,189	87	10	510	167	317	539	7,323	10,171
9. Summit	1,013	20	472	730	114	266	1,602	12,004	16,299
10. Aptos/In Sella	2,118	84	0	688	135	9,781	2,268	4,759	19,833
11. Larkin Valley	1,249	14	24	750	119	770	9,011	14,942	26,907
12. South Beach	444	34	0	522	2	262	2,714	6,349	10,147
13. Watsonville	1,516	232	410	659	273	1,071	1,612	3,552	9,557
14. Eureka	17,157	1,325	1,792	12,735	5,454	25,253	5,402	189,493	282,689
TOTAL	201	41	2	604	20	46	10,205	10,205	16,001

*For Live Only, includes agricultural buildings only.
 **Utilities only; streets included with other uses.
 Includes Vacant
 Totals for land use categories and
 for planning areas do not add
 because of the lack of available
 data for planning area 1.

Source: AMBAG Data Sheets
 Santa Cruz County Community Resource Agency,
 October, 1977.

BEFORE THE BOARD OF SUPERVISORS
OF THE COUNTY OF SANTA CRUZ, STATE OF CALIFORNIA

RESOLUTION NO. 418-80

On the motion of Supervisor Patton
duly seconded by Supervisor Liddicoat
the following resolution is adopted:

RESOLUTION REGARDING LEASE SALE 53

WHEREAS, the United States Department of the Interior is charged with administering the mineral development of the Outer Continental Shelf under the OCS Lands Act of August 7, 1953 (67 Stat. 452; 43 USC: Sections 1331-1343) and the OCS Lands Act Amendments passed by Congress September 18, 1978 (92 Stat. 649; 43 USC: Sections 1344-1348); and

WHEREAS, the Department of the Interior has proposed leasing of tracts in five basins off the coast of Central and Northern California in May of 1981, known as Lease Sale 53, and

WHEREAS, parts of the Santa Cruz Basin tracts are offshore from Santa Cruz County, and the Monterey Bay is bracketed between the two tracts with the highest probable resource estimates; and

WHEREAS, the Bureau of Land Management has prepared the Draft Environmental Statement for Lease Sale 53; and

WHEREAS, the Santa Cruz County Board of Supervisors has adopted two Resolutions in the past opposing Lease Sale 53 and the five-year Lease Plan as proposed, for various economic and environmental reasons; and

WHEREAS, thus far our concerns and input have been disregarded by the Department of the Interior in the Draft Environmental Impact Statement in their refusal to at least delay consideration of Lease Sale 53 until adequate environmental studies have been completed; and

WHEREAS, it remains clear that the Department of the Interior cannot adequately evaluate the potential impact of offshore oil development in five widely separate geologic basins in a report limited to 100 pages, and

WHEREAS, the Draft Environmental Statement is inadequate in its analysis of potential impacts on Santa Cruz County resulting from oil and gas development activities, specifically regarding modeling of oil spill risk and economic repercussions, and in findings of "minimal impact" on commercial fisheries, tourism and recreation, marine life and air quality; and

WHEREAS, the Department of the Interior as mandated, has formally requested public review of comment on the Draft Environmental Impact Statement on Lease Sale 53; and

WHEREAS, a Public Hearing on Lease Sale 53 will be held by the Bureau of Land Management in Santa Cruz on June 25, 1980 and a written testimony is to be accepted until July 3, 1980; and

WHEREAS, the Department of Interior is mandated to consider and respond to all comments on the Draft Environmental Impact Statement; and

WHEREAS, the proposed action could threaten the coastal resources and character of Santa Cruz County.

NOW, THEREFORE, BE IT RESOLVED that the position of the Santa Cruz County Board of Supervisors is that the Santa Cruz Basin should be deleted, and the leasing of the Santa Maria Basin delayed for a minimum of two years, or until such time that adequate baseline environmental studies are completed; and

BE IT FURTHER RESOLVED, that if the Santa Cruz Basin is not deleted and leasing of the Santa Maria Basin is not delayed, then it is the position of the Santa Cruz County Board of Supervisors that the six mile buffer zone (under alternative 2) and deletion of tracts in the Northern Santa Maria Basin to reduce probable impacts on sea otters (under alternative 3) be included as improvements over holding the sale as proposed and that an additional alternative be considered for establishment of a petroleum reserve to be used only in time of national emergency.

PASSED AND ADOPTED by the Board of Supervisors of the County of Santa Cruz, State of California, this 24th day of June, 1980, by the following vote:

AYES: SUPERVISORS FORBUS, LIDDI-COAT, MATTHEWS, PATTON, LIBERTY
NOES: SUPERVISORS NONE
ABSENT: SUPERVISORS NONE

PAT LIBERTY, Chairman of the
Board of Supervisors

HELEN J. BRIGHTWELL

ATTEST:
Clerk of said Board

Approved as to form:

Helen J. Brightwell
County Counsel

Distribution: Planning
County Counsel

STATE OF CALIFORNIA	95
COUNTY OF SANTA CRUZ	
I, GEORGE T. NEWELL, County Administrative Officer and ex-officio Clerk of the Board of Supervisors of the County of Santa Cruz, State of California do hereby certify that the foregoing is a true and correct copy of a resolution passed and adopted by and entered in the minutes of the said board, in witness whereof I have hereunto set my hand and affixed the seal of the said Board, on	
By <i>George T. Newell</i>	19 80
GEORGE T. NEWELL, County Administrative Officer	

BEFORE THE BOARD OF SUPERVISORS
OF THE COUNTY OF SANTA CRUZ, STATE OF CALIFORNIA

RESOLUTION NO. 418-80

On the motion of Supervisor Patton
duly seconded by Supervisor Liddicoat
the following resolution is adopted:

RESOLUTION REGARDING LEASE SALE 53

WHEREAS, the United States Department of the Interior is charged with administering the mineral development of the Outer Continental Shelf under the Outer Continental Shelf Lands Act of August 7, 1953 (67 Stat. 452; 43 USC Section 1331-1341) and the 100% Lands Act Amendments passed by Congress September 18, 1974 (94 Stat. 649; 43 USC Sections 1341-1343); and

WHEREAS, the Department of the Interior has proposed leasing of tracts in five basins off the coast of Central and Northern California in May of 1981, known as Lease Sale 53, and

WHEREAS, parts of the Santa Cruz Basin tracts are offshore from Santa Cruz County, and the Monterey Bay is bracketed between the two tracts with the highest probable resource estimates; and

WHEREAS, the Bureau of Land Management has prepared the Draft Environmental Statement for Lease Sale 53; and

WHEREAS, the Santa Cruz County Board of Supervisors has adopted two Resolutions in the past opposing Lease Sale 53 and the five-year Lease Plan as proposed, for various economic and environmental reasons; and

WHEREAS, thus far our concerns and input have been disregarded by the Department of the Interior in the Draft Environmental Impact Statement in their refusal to at least delay consideration of Lease Sale 53 until adequate environmental studies have been completed; and

WHEREAS, it remains clear that the Department of the Interior cannot adequately evaluate the potential impacts of offshore oil development in five widely separate geologic basins in a report limited to 300 pages, and

WHEREAS, the Draft Environmental Statement is inadequate in its analysis of potential impacts on Santa Cruz County resulting from oil and gas development activities, specifically regarding modeling of oil spill risk and economic repercussions, and in findings of "minimal impact" on commercial fisheries, tourism and recreation, marine life and air quality; and

WHEREAS, the Department of the Interior as mandated, has formally requested public review of comment on the Draft Environmental Impact Statement on Lease Sale 53; and

WHEREAS, a Public Hearing on Lease Sale 53 will be held by the Bureau of Land Management in Santa Cruz on June 25, 1980 and a written preliminary is to be accepted until July 3, 1980; and

WHEREAS, the Department of Interior is mandated to complete and respond to all comments on the Draft Environmental Impact Statement; and

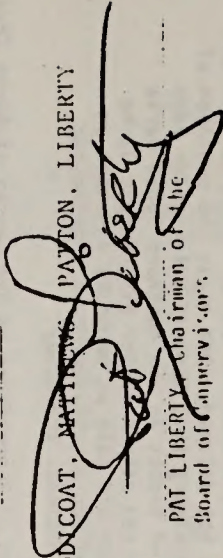
WHEREAS, the proposed action could threaten the coastal resources and character of Santa Cruz County.

NOW, THEREFORE, BE IT RESOLVED that the position of the Santa Cruz County Board of Supervisors is that the Santa Cruz Basin should be deleted, and the leasing of the Santa Maria Basin delayed for a minimum of two years, or until such time that adequate baseline environmental studies are completed; and

BE IT FURTHER RESOLVED, that if the Santa Cruz Basin is not deleted and leasing of the Santa Maria Basin is not delayed, then it is the position of the Santa Cruz County Board of Supervisors that the six mile buffer zone (under alternative 2) and deletion of tracts in the Northern Santa Maria Basin to reduce probable impacts on sea otters (under alternative 3) be included as improvements over holding the sale as proposed and that an additional alternative be considered for establishment of a petroleum reserve to be used only in time of national emergency.

PASSED AND ADOPTED by the Board of Supervisors of the County of Santa Cruz, State of California, this 24th day of June, 1980, by the following vote:

AYES: SUPERVISORS FORBUS, LIDDICOAT, PATTON, LIBERTY
NOES: SUPERVISORS NONE
ABSENT: SUPERVISORS NONE


HELEN J. BRIGHTWELL
PAT LIBERTY, Chairman of the
Board of Supervisors

HELEN J. BRIGHTWELL

Attest:
Clerk of said Board

Approved as to form:

County Counsel

Distribution: Planning
County Counsel

STATE OF CALIFORNIA
COUNTY OF SANTA CRUZ
I, GEORGE T. NEWELL, County Administrative Officer and ex-officio Clerk of the Board of Supervisors of the County of Santa Cruz, State of California do hereby certify that the foregoing is a true and correct copy of a resolution passed and adopted by and entered in the minutes of the said board. In witness whereof I have hereunto set my hand and affixed the seal of the said Board on 19
GEORGE T. NEWELL, County Administrative Officer

COUNTY OF SANTA BARBARA



ALBERT F. REYNOLDS
Director
105 E. Annapolis St.
Santa Barbara, Calif. 93101
Telephone 966-1611

DEPARTMENT OF ENVIRONMENTAL RESOURCES

TO: Honorable Board of Supervisors
Santa Barbara County

FROM: Albert F. Reynolds *ALR*
Director

DATE: June 16, 1980

RE: Proposed Santa Barbara County Comments on OCS Lease Sale No. 53
Draft Environmental Impact Statement

Recommendation:

That your Board:

1. Approve the enclosed letter to BLM Director Frank Gregg transmitting Santa Barbara County comments on the Lease Sale #53 DEIS.
2. Authorize Santa Barbara County CEIP consultant Allan Lind to present these comments at the June 23, 1980 public hearing in San Francisco.

Background:

OCS Lease Sale No. 53 is scheduled for February 1981. Tentative tracts include 115 tracts offshore from Santa Maria. The Bureau of Land Management (BLM) has prepared a Draft EIS (DEIS) on the proposed sale.

Staff of DER, APCD, LCP, and Petroleum Division of Public Works have reviewed the DEIS. This proposed County response has been prepared by County Energy Consultant Allan Lind and DER staff.

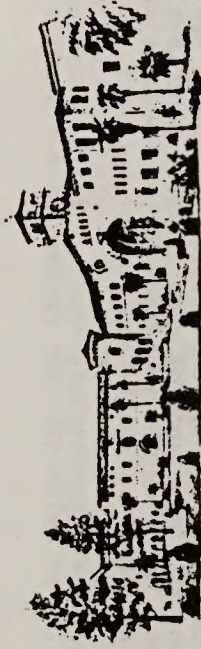
The proposed County testimony acknowledges the energy problems facing this nation and the importance of each region's contribution to domestic oil production. It notes the abundance of previously leased tracts in the Santa Barbara Channel which have not yet been explored by industry. It points out the paucity of data on the Santa Maria basin and recent fault discoveries and earthquakes centered in the proposed leasing area. Finally, the letter reiterates the request of the Northern California

Board of Supervisors
June 16, 1980
page 2

Congressional Delegation and the California Coastal Commission for a two year delay of Lease Sale No. 53 so that Environmental Baseline Studies can be completed to more adequately identify those areas where significant environmental factors may warrant protection and/or mitigation from oil and gas development.

AFR:DV:sb
Encl.

ROBERT L. MEDLUND
Chairman
Fourth District
WILLIAM B. WALLACE
Vice-Chairman
Third District
DAVID YAGER
First District
ROBERT E. KALLMAN
Second District
HARRELL FLETCHER
Fifth District



HOWARD C. MINNITI
County Clerk-Recorder
and Ex-Officio
Clerk of the
Board of Supervisors

COUNTY OF SANTA BARBARA

BOARD OF SUPERVISORS
105 East Anapamu Street
Santa Barbara, California 93101
Telephone (805) 966-1611
Ext. 7610

June 16, 1980

Mr. Frank Gregg, Director
Bureau of Land Management
Department of the Interior
Eighteenth and C Streets, NW
Washington, D.C. 20240

Re: Santa Barbara County Comments on Proposed Oil and Gas
OCS Lease Sale No. 53 DEIS

Dear Mr. Gregg:

We have reviewed the DEIS on Proposed OCS Lease Sale No. 53 off Central and Northern California. While the document is much more readable due to its brevity, scope, and comprehensiveness, nevertheless we find it deficient in several major areas.

Need for Sale

Santa Barbara County recognizes the energy problems facing this nation and the importance of each region's contribution to meeting the energy budget of the country. We would point out that the majority of the Santa Barbara Channel has been leased and that a large number of these tracts have never been explored. Several leases have been cancelled for non-diligence.

We have yet to see the USGS underestimate oil and gas reserves on the OCS; yet the most optimistic production forecast for Lease Sale #53 represents less than one half percent of the nation's oil supply and less than one percent of forecasted oil imports. We do not believe that the seismic, air quality, oil spill, housing, aesthetic, and economic risks associated with the proposed sale are offset by a reduced imports demand of less than one percent.

Frank Gregg, Director
Bureau of Land Management
June 16, 1980
page 2

Seismic Hazards

The DEIS does not adequately address seismic hazards of oil development in the Santa Maria Basin. No mention is made of recent fault discoveries in the area and earthquakes centered in the Santa Maria Basin. It is not sufficient to state that, "pipelines must be flexible." Instead, tracts should be identified in which seismic hazards may preclude oil development or warrant special mitigation.

Environmental Baseline Studies

The generalized, incomplete, inadequate seismic analysis is representative of other evaluations in the DEIS. Little environmental data now exists in the Lease Sale No. 53 area. Baseline studies underway for BLM will not be complete until late 1980 and were not available to include in the EIS process. These studies could provide valuable information which should be included in the EIS.

Two Year Delay

Because existing environmental data is scant but will be forthcoming with the completion of the Environmental Baseline Studies, because industry is presently incapable of exploring existing lease tracts of previous sales due to deepwater drilling vessel shortages, and because of the minimal oil resources of the Sale area, the County of Santa Barbara requests a two year delay for Lease Sale No. 53. We join the Northern California Congressional Delegation and the California Coastal Commission in this request.

Use of Onshore Pipeline

Santa Barbara County welcomes the discussion of onshore pipelines in the DEIS. The document contains a proposed lease stipulation requiring pipelines offshore if feasible. A similar stipulation should be included requiring the use of onshore pipelines to refinery if feasible.

Fair Treatment of the No-Sale and Delay-the-Sale Alternatives Has Not Been Given

These alternatives are handicapped from the outset by an attempt to link them in the reader's mind with phrases like "increased crude oil imports," "increased dependence on insecure foreign sources of oil," and "decreased employment and income prospects." The No-Sale Alternative is simply the status quo: it changes nothing. Granted, the proposed lease sale offers the hope (not guarantee) of decreasing crude oil imports and dependence, and increasing employment and income prospects. The proposal also invites substantial environmental risks. But the inverse, i.e. No Sale, does not increase imports and dependence or decrease jobs and income.

In fairness, the EIS must make it clear that: (1) the proposal offers an opportunity to increase domestic production with attendant environmental risks, and (2) the No-Sale Alternative preserves the status quo

Frank Gregg, Director
Bureau of Land Management
June 16, 1980
page 3

without risk to the environment. Similarly, the Delay-the-Sale Alternative simply prolongs the status quo until such time as better information will permit a more informed decision on whether or not the sale should be held.

Primacy of Use on the OCS is Confused

There is a distinct bias in the text whenever another use of the OCS is mentioned in conjunction with oil and gas development: the other use is always in conflict with oil and gas activities. The text invariably relies on national energy policy dictating "increase domestic oil production" as the sole criteria for making decisions about activities on the OCS. It would be refreshing to have the text note that there is also a national environmental policy to preserve our environment and protect our renewable resources, a national urban policy to preserve our cities and local economies, a national maritime policy to build and strengthen our shipping industry, etc. Instead, the text consistently subordinates all other uses of the OCS to oil and gas activities. Given equal weight, the No-Sale Alternative takes on new significance.

Lease Sale #53 Could Mean More Oil Spills, Not Less

The FIS argues that Lease Sale #53 oil will back out an equal amount of foreign oil and thereby reduce tanker related oil spills because Lease Sale #53 oil will be transported in safer American ships with American crews while foreign oil will not. The correlation is unsound and the argument too simple. First, the two major tanker spills on the west coast involved American flag ships only, no foreign vessels were involved.

Second, oil spills from tankers are related to frequency of movement, not origin. In this instance, there could be up to five times as many tanker movements required to move Lease Sale #53 oil as foreign oil because foreign oil is moved in a few big ships, and domestic oil is moved in a lot of little ships. To make matters worse, the coastwise traffic of Lease Sale #53 oil is likely to be in older, outmoded tankers lacking double hulls, redundant power, and a full range of navigational aids.

Support for the Six-Mile Buffer Zone to Protect Onshore Air Quality

The FIS considers a very important mitigating measure designed to protect air quality: limit leasing to areas beyond six miles from shore. As the text points out, this measure could reduce potential air pollution onshore by 50 percent, yet it would eliminate less than 20 percent of the tracts originally considered for leasing. This is because U.S.G.S. anticipates that a relatively low resource potential exists in the Santa Maria tracts proposed for deletion. We are strongly in favor of this measure and urge your adoption of it.

Support for Deletion of the Northern Santa Maria Tracts to Protect the Sea Otters

The FIS presents a proposal of eminently good sense: deletion of tracts that could threaten the survival of the California Sea Otters. With an estimated total population of only 1,500 animals, a single catastrophic event could easily eliminate the entire species. Nothing is quite so permanent as total extinction. We strongly favor this measure and urge your adoption of it.

Frank Gregg, Director
Bureau of Land Management
June 16, 1980
page 4

Delete "P-12" Tracts to Protect San Miguel Island, Richardson Rock and Wilson Rock

San Miguel Island, Richardson Rock, and Wilson Rock are a part of the Channel Islands Marine Sanctuary and a part of the National Park System as recently adopted by Congress (PL 96-199). The island and associated rocks are the most important breeding grounds for marine mammals in southern California, comparable to the Farallon Islands of northern California. Yet, the probability of an oil spill hitting these areas is as high as 41 percent according to the BLM oil spill analysis. The analysis identifies a group of 26 tracts known as "P-12" as the source of such a potential oil spill. Over 15 of these tracts would be deleted for air quality reasons as part of your first alternative to the proposed dale. We ask that the 11 remaining tracts of P-12 also be deleted to protect the most important marine mammal breeding area in southern California.

P-12 also encompasses the area of greatest geologic instability of the proposed Lease Sale. In fact, tracts adjacent to P-12 were deleted from Lease Sale #48 by Secretary Andrus for exactly this reason. P-12 is also traversed by the Coast Guard's proposed Traffic Separation Scheme and is the junction for trans-Pacific shipping entering and leaving coastwise traffic to the ports of Los Angeles and Long Beach. Worse yet, P-12 is also the gateway for Alaskan and, potentially, Indonesian LNG destined for the Point Conception LNG Terminal. Finally, P-12 encompasses tracts of primary concern to the Department of Defense. For all of these reasons, we strongly urge that you delete P-12 from further consideration.

Cumulative Impacts

The cumulative impact of Lease Sale No. 53 considered with other major projects should be evaluated. Santa Barbara County is faced with a growth rate well in excess of that forecast in the Proposed Comprehensive Plan. This growth is attributed to major state and local projects such as LNG, Missile X, Space Shuttle, Lease Sale #48, Lease Sale #53, Lease Sale #68, etc. While the impacts of one individual project may not seem significant, the housing, traffic, and air quality impacts of this project could be the straw that broke the camel's back.

This concludes our remarks on the DEIS. Additional specific comments are enclosed. I will look forward to seeing major improvements in the Final Environmental Impacts Statement in response to these comments.

Sincerely,

Robert L. Hedlund

Robert L. Hedlund
Chairman

RLH:DV:sb

Encls.

cc: Governor Edmund G. Brown, Jr.
Senator Allan Cranston
Congressman Robert Lagomarsino
Ms. Deni Greene
Mr. Michael Fisher
Mr. William Grant

We suggest that BLM staff substitute the above paragraph for paragraph No. 6, page IV.

SANTA BARBARA COUNTY COMMENTS ON THE
DEPARTMENT OF THE INTERIOR DRAFT
ENVIRONMENTAL IMPACT STATEMENT
FOR THE PROPOSED OCS OIL AND
GAS LEASE SALE NO. 53

Pg. IV,
P 6.

This paragraph asserts that "[h]olding the Sale as proposed would also, however, increase domestic oil and gas production, lessen oil imports, contribute toward a more positive balance of payments, and aid in the establishment of secure energy supply sources."

It is unfortunate that this paragraph occurs so early in the text since its exaggeration so misleads the unsuspecting reader. The statement is unfounded in fact and unsupported in text. Simply holding the Sale cannot guarantee production of oil and/or gas, much less the results attributed to it in this paragraph. Substituting "could" for "would" in this paragraph reduces this exaggeration to the milder flight of fantasy the author(s) seem bent on throughout the rest of the text. Stripping false pride from the apparent lease-at-any-cost imperative would lead an unbiased observer to the conclusion that:

Holding the Sale as proposed could result in some leasing and subsequent oil and gas exploration. If oil and gas are discovered in economically recoverable amounts, U.S. domestic petroleum production would increase, contributing to a lessening of the U.S.-international imbalance of payments, a lessening of oil imports, and aid in the establishment of secure energy sources. It is the purpose of this EIS to compare the speculative benefits of holding this lease sale against the potential environmental costs of that decision.

Page IV,
P 7.

This paragraph attributes air quality benefits to "Alternative 2" which deletes tracts within 6 miles of the Santa Cruz and Santa Maria areas. Alternative 2 has additional benefits which should also be noted. The following sentence or a comparable clarification should be added to this paragraph:

"This alternative would reduce the probability of oil spills reaching shore, mitigate the potential effects of OCS oil and gas activities on intertidal organisms and recreational resources, and further reduce the risk of contaminating freshwater aquifers extending offshore in the Santa Maria Basin which might be drilled through during OCS exploration and development."

Page V,
P 2.

This paragraph asserts that a "[d]elay would likely increase crude oil imports." Although such a statement may be true in a very strict sense, the "increase" must be qualified in relative terms. The most probable (20-year) average daily production rate for L.S. #53 is 91,300 B/D according to BLM scenario studies, or less than 4 percent of California refinery capacity and less than .4 percent of national refining capacity. Hence, any increase in imports will be slight if not imperceptible. If the recently projected onshore production increases (California State Lands Commission) are considered, on the other hand, the significance of L.S. #53 production vis a vis oil imports is entirely obscured. A more accurate statement, then, might be:

The effect of a delay of this sale on oil imports must consider the likely market (California) of L.S. #53 oil and competing supplies (Kern County increased production, etc.) to that market. It is unlikely that any delay of this sale will noticeably affect crude oil imports.

Pg. V,
P 3.

This paragraph concerns the "Cancel the Sale" alternative and concludes: "[t]his alternative would be at variance with current national policy encouraging increased domestic production of oil and gas." Of equal importance are national policies designed to preserve indigenous lifestyles, the local economy and sensitive environmental resources. On balance, the paragraph should acknowledge these national policy directions by adding the following to the sentence quoted above: ". . . production of oil and gas, and serves national policy to preserve the environment, protect the local economy, and maintain the quality of community lifestyles."

7-61

Pg. 1-60,
P 1.

General Comment. Described on this and the following pages are seven lease stipulations. We suggest you make clear that these stipulations will be strictly enforced through Section 24: Remedies and Penalties, of the OCS Lands Act, i.e., persons failing to comply with such stipulations shall be liable to a civil penalty of \$10,000 per day of continuance of the violation [24(b)] and any person convicted of knowingly and willfully violating such stipulations shall be punished by a fine of not more than \$100,000, or imprisonment for not more than ten years [24(c)].

Pg. 1-60,
P 61.

These pages describe a "Biological Stipulation" to any lease issued as a result of L.S. #53. It vests exclusive

authority in the Area Oil and Gas Supervisor for its enforcement and also assigns exclusive responsibility in the Supervisor for determining whether an area of special biological significance exists. It is not explained how this latter determination will be made. We feel very strongly that agencies expert in the field be made a part of the decision-making process because the Supervisor's daily responsibilities prevent him from becoming an authority on the recognition of biologically significant areas. The text should be revised to specify mandatory consultation with the U.S. Fish and Wildlife Service, the California Department of Fish and Game, and the California Coastal Commission. Such a revision is consistent with your "Cultural Resource Stipulation" (pages 1-61, 62, 63) which specifies that the Supervisor's determinations be based on a report of "a qualified marine survey archaeologist" and that the Supervisor's review is done in conjunction with the Manager of the BLM OCS Office.

Pg. 1-63,
P 4.

This paragraph restricts the "Geological Stipulation" to tracts specified before the Lease Sale. The purpose of the stipulation is to provide for the safety of offshore workers and protect against oil spills in the event that geologic hazards threaten. A presumption here, apparently, is that all geologic hazards in the Lease Sale area will be identified prior to leasing, affecting only a portion of the tracts offered. While it may be true that only a few tracts pose geologic hazards, achieving certainty as to their identity prior to

leasing may not be entirely possible. This stipulation should be applicable to all tracts leased if only because of the unpredictable nature of California geology. Page 1-63, paragraph 4 should be revised as follows: "The following stipulation represents conditions that may be imposed on all leases resulting from this Lease Sale."

Pg. 1-69,
70, 71
P 3.

These pages describe pipeline and subsea well stipulations designed to encourage the use of pipelines over surface vessels for transporting oil and gas ashore and protecting fishing gear from ocean floor structures. We feel these stipulations are excellent and should not be weakened in any respect.

7
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62

Pg. 1-80,
P 3.

This paragraph identifies the status of three proposed Federal marine sanctuaries offshore California. It should be updated to reflect their current status.

Pg. 2-5,
P 2.

This paragraph, only one sentence (ten words), summarizes a conclusion that the effects of "long-term chronic oil pollution remain uncertain," presumably based on supporting text. A review of the text reveals that the conclusion is really only an assertion whose only basis in the text is the very same sentence (see page 4-118, P3). This expedient dismissal should be replaced by a discussion of the suspected consequences of chronic oil pollution.

Pg. 2-8,
P 2.

This paragraph states that traffic lanes "could increase the cost of exploration and development substantially." The statement is misleading. The sentence does not inform

the reader or decision-maker that the traffic lanes affect only a small percentage of tracts available. Further, the conclusion that a substantial cost increase could result is simply not supported by actual exploration and development history (see, for example, Shell Oil's Beta Development directly in the San Pedro Bay Vessel Traffic Separation Scheme). Finally, if VTSS are established to minimize the risks of collisions or ramming, clearly their establishment will reduce the overall regional costs of exploration and development to the nation, petroleum industry, maritime industry and local economies--not increase the cost. The sentence should be deleted.

Pg. 2-17,
P 2, 3.

These paragraphs summarize the environmental consequences of the "Alternative to Modify the Sale by Deleting Part of the Santa Cruz and Santa Maria Area to Improve Air Quality." They are deficient by not including the U.S.G.S. conclusion that "a relatively low resource potential exists in the Santa Maria tracts proposed for deletion," and "[f]or the Santa Cruz area, the resources in the proposed deleted areas are considered very low." By including these statements with the statements of environmental benefit the full value of this alternative can be better appreciated. This is consistent with the concluding paragraph of Alternative 3 (see page 2-24, last sentence).

Pg. 2-25,
26, 27.

These three pages present the "No Sale Alternative." The environmental impacts of this alternative are not presented per se, except by way of saying what won't happen: "[a]ll

Closer to home, it can also be noted that California onshore production is expected to increase by 50 percent in the next five years which further diminishes the importance of L.S. #53 oil as a substitute for oil imported to that market. All in all, it is very difficult to justify L.S. #53 on the basis of its contribution to a solution for our national energy and economic problems. Considering the range of possible adverse environmental impacts of the proposed sale, it is clearly a legitimate question to ask: is Lease Sale #53 part of the solution, or part of the problem? If the weight of the text alone was the deciding factor, the answer is clear: environmental risks outweigh anticipated national (or local) benefits. The No-Sale Alternative is a legitimate alternative and demands further discussion. The text provided--i.e., discussion of "substitutability"--is simply irrelevant.

Pg. 4-11,
P 2, 3.

Paragraph 3 compares the risk of spilling oil from L.S. #53 tankers and tankers carrying foreign imports. This paragraph suggests that tankering L.S. #53 oil between the Santa Maria Basin and the ports of Los Angeles and Long Beach may be safer than tankering the same volume of foreign imports because L.S. #53 oil "would be transported in American ships with American crews operating under rigid safety and training requirements" (paragraph 2). This logic is flawed on at least two accounts.

First, it does not account for the frequency of tanker movement. Santa Maria oil is projected to be moved in 28,000 DWT tankers while foreign oil typically arrives in

activity under the proposed action would not occur"

This sentence references Section IV-B, Probable Impacts of the Proposed Action, a 140-page section listing the environmental consequences of the sale if it does occur. In comparison, the three pages referred to here appear as an attempt to justify the sale on the basis of the nation's energy and economic problems. A direct correlation between the assumed energy and economic benefits of L.S. #53 and the nation's problems is not established specifically here or elsewhere in the text. At best, the text can only offer the boiler-plate placebo: oil and gas produced from domestic sources is good for the economy. The text of this section should explain what direct energy and economic benefits might accrue from Lease Sale #53 to put the No-Sale Alternative in perspective. For example, the text could point out that the most probable average daily recoverable oil estimate for L.S. #53 is less than 4 percent of California's daily refinery capacity or less than .4 percent of the nation's daily refinery capacity; the most probable average daily recoverable gas estimate for L.S. #53 is less than 5 percent of California's natural gas demands, or less than .2 percent of the nation's natural gas demand. Even at peak production (1990), L.S. #53 oil would account for only 1 percent of national daily oil demand or 2 percent of all imported oil and only .2 percent of national daily gas demand. [Estimates based on DOE's OCS Energy Production Goals, February, 1979]. These numbers have a way of suggesting how trivial L.S. #53 actually is with respect to national energy production goals.

tankers up to 160,000 DWT. Hence, it is probable that up to five times as many tanker movements will occur as a result of L.S. #53 as compared to the status quo (i.e., L.S. #53 is not held). To make matters worse, all L.S. #53 oil will move in the coastwise traffic pattern (close to shore) as opposed to foreign oil which approaches the ports from the west (open sea).

The second flaw is the implication that the L.S. #53 vessels will necessarily be safer than vessels transporting foreign oil because L.S. #53 vessels will be of American registry with American crews and vessels carrying foreign oil will not. L.S. #53 vessels are most likely to be 20 years old or older because shipbuilders have virtually discontinued making small tankers for the past two decades. By comparison, tankers in the 160,000 DWT class are likely to be less than 10 years old because the ship building industry graduated to this size only in the last decade. Considering that tanker owners typically expect to amortize their investment in a ship in less than five years; that the older smaller ships are less likely to have double hulls or redundant power and navigational controls; and that the age of a ship is a clear warning of its frailty in open seas; it is unreasonable to assume that L.S. #53 tankers will automatically be safer than tankers transporting foreign oil. Further, the implication that foreign oil will be transported in vessels of foreign registry with foreign crews is not entirely true nor should foreign registry and crewing automatically portend increased risk of oil spills. In fact (and as unpatriotic as this may seem) it should be noted

that the two major oil tanker spills in California waters--the 1971 collision between the Oregon Standard and the Arizona Standard in the entrance to San Francisco Bay, and the 1976 Sansinena explosion in Los Angeles Harbor--involved ships of American registry only; no foreign vessels or crews were involved.

Paragraph 3, page 4-11, should be revised to establish the potential greater risk of oil spills resulting from holding Lease Sale #53 and transporting produced oil by tanker than the status quo (not holding the Sale).

Pg. 4-118, Trivia: These paragraphs are identical and one
Pg. 4-121, should be deleted.
Pg. 4-121, should be deleted.

Pg. 4-164
Pg. 2

This paragraph suggests that the cost to develop leased tracts which are crossed by vessel Traffic Separation Schemes could be higher than other leased tracts. The rationale offered is: if an oil and/or gas discovery underlies a lane, it may require two platforms--one on either side of the lane--rather than one, to develop the field; directional drilling could be required (as if this was uncommon); and that shallow fields may not be reachable from surface structures outside of the lanes, even with directional drilling. Responding in reverse order: Shell Oil is currently developing an exceptionally shallow field under a traffic lane in San Pedro Bay from outside the lane. Directional drilling is not only common in OCS development, it is almost indispensable, regardless of vessel traffic lane conflicts. And, finally, "two fixed

platforms, one on each side of the traffic lane, may be needed instead of one," is an absurd suggestion; the offshore petroleum industry frequently drills wells up to a mile from the drilling platform, satellite wells might also be the first choice to develop a field not entirely reachable by a single platform, regardless of the presence of a traffic lane.

Indeed, developing a lease crossed by a traffic lane could be more expensive than a comparable lease without a traffic lane, but not for the reasons cited. The point we wish to make is that the text as written suggests that other uses of the OCS should be subordinated to oil and gas development if we are to avoid unnecessary (sic) costs to developing this resource. The text should reflect the intent of establishing a TSS: to make the OCS safe for all legitimate uses. It can be argued that establishing a TSS ultimately reduces costs of OCS oil and gas development (see our comment on page 2-8, P 2, above). The text should be revised to emphasize the importance of TSS as a means of improving safety for all OCS uses--not as a possible hindrance to OCS oil and gas development.

Pg. 4-166
P 3
This paragraph concludes that "[t]raffic lanes crossing the Eel River and Santa Maria tracts could increase the cost of exploration and development substantially." The statement is misleading for the reasons mentioned above.

Pg. 4-217
P 1, 2
These paragraphs summarize impacts of the No-Sale Alternative. Several significant statements are made:

- (1) "Cancellation of the Sale would result in a loss of oil and gas production . . ."

Comment: No one knows whether any oil and gas might be found in economically recoverable amounts. Cancellation of the Sale will only foreclose the opportunity of exploring for unknown resources.

- (2) " . . . this alternative should be viewed within the overall context of oil and gas development in the nation."

Comment: Absolutely. The average daily production projected for L.S. #53 represents .4 percent of national oil demand and .2 percent of the national gas demand. Even the peak production year of 1990 will only provide 1 percent of national demand for oil and gas. Estimated peak oil production (1990) for L.S. #53 would substitute for less than 2 percent of all imported oil; estimated average oil production for L.S. #53 would substitute for less than 1 percent of imported oil.

- (3) "Probably the greatest impact from this alternative is the impact and implications it has for the Department of Energy's production goal for the Pacific OCS."

Comment: DOE's Federal Leasing and Outer Continental Shelf Energy Production Goals are expressed in terms of the year of leasing not the region: no Pacific OCS goal--or, for that matter, Atlantic, or Gulf of Mexico, or Alaskan OCS goal--is defined. The most probable (mean) undiscovered recoverable

oil and gas resources in the proposed Sale area represent 10 percent and 7 percent respectively of DOE's total oil and gas production goal for the OCS.

- (4) "The No-Sale Alternative would result in less sale activity than required by the proposed Five-year OCS [national leasing] schedule and a failure to meet national economic and energy production goals."

Comment: The proposed Five-year OCS Leasing schedule does not require anything, it is a planning tool for deciding which OCS areas will be studied for leasing in what order. If L.S. #53 oil would substitute for less than 2 percent of all imported oil, it is difficult to understand how the No-Sale Alternative would result in a failure to meet national economic goals.

(5) "There would also most likely be an increase in crude oil imports to satisfy national energy needs if oil and gas were not produced from OCS Sale #53. This would arise because of the lack of substitution among primary energy sources used in the nation."

Comment: Cancellation of the Sale will not increase crude oil imports, it will maintain the status quo. "Substitution" has nothing to do with the issue.

- (6) "There would be an increased dependence on foreign oil."

Comment: Again, the No-Sale Alternative does not in itself increase dependence on foreign oil, it simply preserves the status quo.

- (7) "It could cause a decrease in employment and income . . ."

Comment: How? The No-Sale Alternative is the existing condition, it cannot diminish employment and income.

In summary, we disagree with almost every statement of this brief assessment. An objective assessment of the No-Sale Alternative simply has not been done. Until this section is thoroughly revised, the utility of the DES as an aid to making an informed decision on proposed OCS Lease Sale #53 is not possible.

Pg. 4-218
P 2

This paragraph summarizes the impacts of the Delay the Sale Alternative. It contains similar errors of logic mentioned above; i.e., "increased crude oil imports," "increased dependence," "decreased employment and income prospects." The paragraph needs to be rewritten consistent with the comments listed above for page 4-217.

AIR POLLUTION CONTROL DISTRICT

COUNTY OF SAN LUIS OBISPO • P.O. Box 637 • SAN LUIS OBISPO, CALIFORNIA 93406



EARL R. KALAR
AIR POLLUTION CONTROL OFFICER

July 1, 1980

AC/805
549-5912

Mr. William Grant
Bureau of Land Management
Pacific OCS Office
1340 W. Sixth Street, Room 200
Los Angeles, CA 90017

Subject: Comments on Pacific Outer Continental Shelf Reference Paper
No. 53-5: Air Quality Impact of Proposed Outer Continental
Shelf Sale No. 53 Offshore Central and Northern California

Dear Mr. Grant:

The San Luis Obispo County Air Pollution Control District technical and management staff have completed a detailed review of Pacific Outer Continental Shelf Reference Paper 53-5: Air Quality Impact of Proposed Outer Continental Shelf Sale No. 53 Offshore Central and Northern California (POCS 53-5). Our review focused primarily on air quality impacts resulting from development of the Santa Maria Basin.

While the document appears to be comprehensive and thorough in its approach to air quality issues we have concluded that, in fact, there are several major deficiencies in the paper that make it inadequate for determining whether Lease Sale #53 should proceed. Since the information on air quality contained in the DEIS is drawn from this document, one must conclude that the DEIS is also inadequate.

The areas of major concerns are outlined below with the most critical issues listed first. Specific comments on POCS 53-5 appear in Attachment 1.

1. The analysis uses projections of future air quality levels in San Luis Obispo County that are not consistent with the Air Quality Attainment and Maintenance Plan. This distorts the true impact from OCS development.
2. Although only four ozone exceedances in a three year period will put our County into nonattainment status the document does not even address the question of how many ozone exceedances are likely to occur as a result of OCS development.
3. The analyses use the mean resource estimate rather than the high estimate and are, therefore, not worst case projections.

4. The document relies heavily on the assumption that the USGS OCS air quality regulations will mitigate most if not all of the air quality impacts when, in fact, the regulations for California are not final and those affecting the entire country are new and have not been applied in real life operations. Also, no air quality analysis has been made using the new regulations as a basis for degree of control so those assumptions may well be erroneous.
5. The analysis does not show the effects on air quality due to doubling the allowable emissions every three miles as proposed in the USGS regulations.

Possibly our greatest concern is with an issue that is not specific to air quality. This is the feeling that persists in our area that the decision on Lease Sale 53 has already been made, based not on a balanced review of all the issues, not on the validity of the EIS and the comments of the public, but based rather on a petroleum production goal issued by the Department of Energy. There is little else that the Department of Interior and Bureau of Land Management could do that would so damage their credibility as to merely pay lip service to the people of this Country. The backlash of such actions will almost certainly tell in the long run.

In light of our findings the Air Pollution Control District recommends that the Lease Sale be delayed until the concerns and issues we have raised have been addressed. And that if proper analysis shows that the development will cause a violation of a National Ambient Air Quality Standard, or significant air quality deteriorations, the Basin be put into a National Petroleum Reserve.

In the event OCS development proceeds you should impose lease sale stipulations requiring all projects, before being granted an Exploration or Development and Production permit, to: conduct an air quality impact analysis, including cumulative impacts; incorporate all mitigation measures necessary to ensure all air quality standards or increments of air quality deterioration are not exceeded; conduct pre-construction and post-construction ambient air quality monitoring at the points of predicted maximum onshore impact; consolidate oil and gas processing at a single site onshore; and transport all oil and gas via an onshore pipeline.

Very truly yours,

Robert W. Carr

ROBERT W. CARR
Assistant Air Pollution Control Officer

RWC/kw
Attachment

cc: Mr. Frank Gregg, Bureau of Land Management
Tom Austin, ARB
Michael Fischer, Calif. Coastal Commission
John English, Santa Barbara County APCD
Jan Bush, Ventura County APCD
L.D. Odle, Monterey Bay APCD
Beryl Reichenberg, Clean Air Coalition

ATTACHMENT 1

COMMENTS ON A.Q.1.A.

July 1, 1980

Chapter	Pg.	Paragraph							
III	11+		Note: Discussion of DOI's A.Q. responsibility and proposed regulations. The discussion must be revised in light of the new final OCS regulations and the proposed California OCS regulations.	V	21 & 22	6 1	Local districts have no way to enforce the use of low-sulfur fuel in port. This assumption is inappropriate, and emission and impact calculations based on it should be revised to reflect real-world combustion of high-sulfur fuel in coastal waters.		
III-28,29			Note: Discussion of San Luis Obispo County Air Quality Maintenance Plan and attainment status.	V	23	2	Local districts have no control, and U.S.G.S. may not require vapor balance lines between platforms and the O.S.& T. This assumption is inappropriate, and emission and impact calculations based on it should be revised.		
IV	56	1	Only the northern portion of San Luis Obispo County is nonattainment for particulate. The text should be revised to reflect the correct nonattainment designation.	VI	2	1	(Final assumption) "Maximum possible background levels were assumed in assessing the potential for violation of air quality standards". In cases where a maximum background level is assumed to exceed the standard, such as highest 1990 ozone levels at Nipomo, addition of an increment due to OCS activity gives no information about the potential for violation of air quality standards. The critical question of OCS contribution to violations of air quality standards in such a situation must be resolved by looking at existent background levels which approach but do not exceed the standard. To obtain a true picture of potential OCS impact on air quality, the probable frequency of OCS-induced violations of standards also must be determined. This air quality impact analysis is seriously inadequate without careful consideration of these questions. We have previously commented on this deficiency both verbally and by letter, and have received no assurance that this needed reanalysis will be performed.		
IV	56	4	NO ₂ has historically been monitored in other San Luis Obispo County locations than the City of San Luis Obispo. The text should be revised accordingly.	VI	34	4	This paragraph has evidently been added to address our concerns about violation of standards in "marginal" attainment areas. It basically says 'we can't predict that impact precisely', but ignores the point that a far better analysis than the current one can should be performed. The question of OCS-induced violations of air quality standards is the basic reason for this impact analysis, and that analysis is inadequate regarding ozone air quality onshore of the Santa Maria Basin.		
IV	56	5	The highest 24-hour average SO ₂ value measured at Nipomo in 1977 was 70% of the combined state SO ₂ /TSP or O ₃ standard, as stated correctly on page VI-17, paragraph 5.						
IV	56	7	Total hydrocarbon (uncorrected for methane) is measured at San Luis Obispo. Compliance or exceedance of the Federal non-methane hydrocarbon standard has not been determined. The text should be revised accordingly or explanation given for this statement.						
IV	56	8	Discussion of ozone in San Luis Obispo County should relate to interpretation of the new Federal standard, i.e. Paso Robles and Nipomo have experienced less than an average of one exceedance day (a day with at least one violation of the hourly standard) per year, but, the highest values for years without such an exceedance have been within 0.01 ppm of the Federal standard.						
IV	14	1	Sufficient time has elapsed since the Campeche Bay blowout to incorporate that event into this risk analysis, and that should be done. The statement that blowouts are the result of human or mechanical error, etc., rather than drilling itself, inspires little confidence that drilling will not result in a blowout on the Pacific OCS. Natural "blowouts" do not occur without drilling, humans and machines cannot err to cause an accident. This "game of words" statement should be removed from the text.	VI	61	6	The final sentence in this paragraph states in a veiled fashion that OCS emissions may cause problems for ozone attainment in onshore areas near three of the five basins. All of the weasel-words in the sentence again points up the need for better, conclusive air quality modeling.		
				VII	30	1	Since the U.S.G.S. regulations have changed, the mitigation of hydrocarbon emissions in the Santa Maria area is not assured. This portion of the text should be rewritten.		

AIR POLLUTION CONTROL DISTRICT

COUNTY OF SAN LUIS OBISPO • P.O. Box 637 • SAN LUIS OBISPO, CALIFORNIA 93406



EARL R. KALAR
AIR POLLUTION CONTROL OFFICER

AC/803
549-5912

July 1, 1980

William Grant
Bureau of Land Management
Pacific OCS Office
1340 W. Sixth Street, Room 200
Los Angeles, CA 90017

Subject: Comments on Draft EIS, OCS Lease Sale 53, Proposed 1981 Outer Continental Shelf Oil and Gas Lease Sale Offshore Central and Northern California

Dear Mr. Grant:

We have completed review of the air quality portions of the DEIS for Proposed 1981 Outer Continental Shelf Oil and Gas Lease Sale Offshore Central and Northern California, OCS Sale No. 53, Volume 1 of 2.

This document standing alone is not adequate to assess the possible or probable air quality impacts resulting from outer continental shelf oil and gas development offshore of San Luis Obispo County. The air quality discussions are mostly general and often vague, and the conclusions are not specific. For instance, there is no conclusion on whether emissions from OCS projects will cause exceedance of the ozone standard and, if so, on how many days that will occur. We previously commented on this concern during review of the Preliminary DEIS, and it again is not addressed in this draft. We, therefore, fear that accurate, specific conclusions will also not be in the Final EIS, when there will be no opportunity for our comment.

Economic and social impacts contained in the document do not even mention the costs to be incurred or the possible loss of business if we must further regulate emissions from onshore facilities to offset new emissions from OCS projects. Cost of hydrocarbon control alone is estimated at approximately \$6,000,000. Also, available onshore offsets are not discussed.

The DEIS proposes a sale alternative that would establish a 6-mile buffer zone along our coast to "improve air quality". Such a buffer may reduce air quality impacts, but certainly won't improve air quality. After the United States Geological Survey rules concerning air emissions are final, and before selection of the alternative(s), an analysis of the effects of the buffer zone should be conducted for all pollutants. An informed decision cannot be made before this is done.

We feel it is unfortunate that Department of Interior cannot or will not coordinate the planning of OCS development in a logical sequence so that informed, intelligent decisions can be made. We previously recommended that the Lease Sale 53 DEIS be delayed until the USGS air quality rules were final or that the air quality analysis could be based on those rules. This suggestion has been ignored.

Our specific comments are attached for your information.

Very truly yours,

Robert W. Carr

ROBERT W. CARR
Assistant Air Pollution Control Officer

RWC/kw

Attachment

cc: Mr. Frank Gregg, Bureau of Land Management
Tom Austin, ARB
Michael Fischer, Calif. Coastal Commission
John English, Santa Barbara County APCD
Jan Bush, Ventura County APCD
L.D. Odle, Monterey Bay APCD
Beryl Reichenberg, Clean Air Coalition

DEIS COMMENTS

June 10, 1980

Chapter 1: Description of Proposal

Page Paragraph

1-19 2 "[OCS L.S. 53] oil . . . is assumed to back out an equal amount of either foreign or Alaskan imports to California. . . . How was this deduced considering that some oil companies are shutting in existing onshore producing wells in the Santa Maria area because of the poor market for high-sulfur heavy California crude? Also, because there is no sound Federal Energy Program, can we assume that oil will be backed out? The assumption cannot be substantiated.

1-20 3 Gas and oil from the Santa Maria area is assumed to be transported to an offshore storage and treatment facility, then piped ashore. Since storage and treatment offshore is optional, the reasoning leading to this assumption should be fully explained.

1-20 to 1-21 1 "Incentives would likely arise" causing refineries to invest in desulfuring equipment? This is completely unsubstantiated, and cannot be merely assumed. The entire subject of processing, distribution and marketing of the sulfurous heavy crude expected from this OCS region has been treated casually in this document, and must be carefully addressed before reaching any conclusions about our country's need for this oil.

Chapter 2: Alternatives; Impact Summary

Page Paragraph

2-2 3 Sale 53 "could add a significant increment to existing SO₂, NO₂, particulate and O₃ levels in some areas. These impacts would be reduced below levels considered significant by DOI imposed mitigation measures". The latter conclusion certainly cannot be substantiated until the U.S.G.S. air quality regulations become final; the effectiveness of proposed regulations has been questioned by onshore air quality agencies. This conclusion should be conditioned or withdrawn until the question has been resolved.

2-5 2 (last line) "State and local government . . . expenditures change to only a very minor degree in the coastal counties." What about costs of air quality attainment planning and economic impact on land-based industry?

Page Paragraph

2-14 2 "Worst case assumptions used in evaluating onshore air quality impacts placed all sources at 3 miles from shore (see section IV B)". "The effect (sic) of locating these sources at 6 miles would reduce onshore worst case impacts by . . . 50% . . .". This whole argument is invalid because of the U.S.G.S. regulations which allow doubling of exempt emissions for each additional three miles from shore.

2-15 1 While there may be some air quality benefit due to the elimination of sources that would have been located in the 3-6 mile area, this benefit should be quantified.

2-23 1 The discussion mentions an "additional 3-mile distance to shore", yet this is not part of the alternative. An air quality discussion specific to this alternative is needed.

Chapter 3: Affected Environment

Page Paragraph

3-30 San Luis Obispo County is not unclassifiable for TSP; the northern portion of the county is non-attainment, and the southern and coastal regions are attainment.

Chapter 4: Environmental Consequences

Page Paragraph

4-50 2 Note: With onshore gas processing (scenario 1A) at Santa Maria 78% of annual HC emissions in the peak production year will occur onshore. For other scenarios, (without onshore processing) onshore HC is less than 1% for same site and year.

4-64 1 Note: Worst case NO₂ levels exceed DOI significance levels onshore for offshore Santa Maria sources.

4-65 The table still fails to list "No Project" SO₂ levels for Santa Maria basin. The "No Data" indication is not correct.

4-71 (Table IV.V.1.a-3) Both the future ozone concentration without L.S. 53 and impact of L.S. 53 are highly unlikely. We project worst case ozone levels of about 12 pphm at that time without OCS. POCS paper 53-5 (AQIA) indicates on page VI-55 a maximum L.S. 53 ozone increment of 2-3 pphm at shoreline, and an increment with a major accident of 7 pphm. The table should be corrected, and the text revised to reflect these impacts.

Page Paragraph

4-72 2 How can the net increase in Santa Maria area ozone "delay attainment" of the O₃ NAAQS, when we already attain the standard? A more appropriate statement here would be "... , could cause the Santa Maria area to become non-attainment for ozone".

The California State O₃ standard is a 1-hour standard, not an 8-hour standard.

4-72 4 The final DOI OCS air quality regulations are so different from the proposed regulations discussed here, that air quality impacts must be re-analyzed.

4-188 1 An unsubstantiated conclusion is made that the U.S.G.S. regulations will control emissions, but that "some small deterioration in onshore air quality will occur." The extent of this degradation will be "dependent on weather conditions", and since the impact will be "temporary", it is "unlikely that it would affect human health." We seriously doubt that the Congress and the EPA would concur in these conclusions given the import they have placed on not allowing onshore sources to cause such deterioration and degradation of air quality.

4-214 The summary table of probable impacts indicates that the same "Onshore and offshore emissions; Degradation of air quality" will occur in each of the five basins. Since no estimate of loss is presented, are air quality impacts implied to be inconsequential?

Also, it is somewhat misleading not to indicate air quality impacts resulting from Oil Spills and Acute and Chronic Discharges.

4-217 1 No mention is made of the alternative energy conservation to compensate for the no-sale alternative. The statement that jobs, government revenue and financing of community services will be significantly decreased as a result of no-sale is a gross exaggeration. Implying that DOE production goals are important in themselves is ludicrous.

General Comment: This document does not discuss San Luis Obispo County's precarious ozone attainment status, or the economic effect on onshore citizens, industry and regulatory agencies which would result from a change in the status due to OCS pollutant emissions. The impacts are potentially major, and the EIS is incomplete without a careful consideration of them.



ADMINISTRATION BUILDING
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EXT. 2313

THE BOARD OF SUPERVISORS OF MARIN COUNTY

Gentlemen:

My name is Ken Lippi and I am representing Marin County Supervisor Gary Giacomini. The comments I will be making have the support of the Marin County Board of Supervisors who have unanimously voted to oppose drilling off Marin's coast. I would like to thank you for this opportunity. As we have stated throughout the entire lease sale process, the input of local government is crucial. Secretary Andrus has urged us to make our opinions known. I am delighted to have the opportunity to do so today. I offer them to you with the hope that they will be taken into consideration when the final decisions are made.

Comments on the draft Environmental Impact Statement for Lease Sale #53

By

Ken Lippi
Administrative Aide to
Supervisor Gary Giacomini,
Marin County Board of Supervisors

For

Bureau of Land Management,
Pacific OCS Office

The County of Marin has been opposed to the lease sale from the start. We told our concerns to Secretary Andrus back in 1978. We discussed our opposition with the Select Committee on the Outer Continental Shelf last summer and we have attended meeting after meeting and written letter after letter stating our opposition. We do not want offshore drilling off the coast of Northern California. We are acutely aware of our national energy crisis and the need to lessen our dependence on foreign imports. The luxury of simply saying we cannot drill off the coast because we don't want rigs in our backyard is past. We are willing to face the fact that our energy needs are real and crucial. We also do not wish it to seem that we are saying, "Oil rigs are O.K. Put them in Southern California, and we are all for them." Our reasons for being opposed to drilling must be logical and completely unselfish. Supervisor Giacomini has called the proposal preposterous and totally unacceptable to the people of Marin. The Marin County Board of Supervisors has commented

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CLERK
VAN GILLESPIE
REGULAR MEETING
TUESDAY, 8 A.M.

on Secretary Andrus' five-year plan. Quite frankly, we have been appalled at the lack of any balancing of low resource values in areas of high environmental sensitivity. It has been debated exactly how much oil exists in the tracts off Marin and Sonoma counties. The Federal Government's own survey estimates establish that the potential yield could be only 8 million barrels, less than one day's national supply of oil from an area of extreme environmental sensitivity.

We called for delays until the proper environmental studies were completed, but those requests were ignored. We are now being asked to comment on a document which has obviously been thrown together to meet a ridiculously short timetable. In reading the draft Environmental Impact Statement, one finds himself asking whether or not the author has ever set foot in our county. Their maps fail to note the largest national recreation area on the west coast. Perhaps I should briefly remind you that the Federal investment protecting our coast is staggering. \$60 million was spent on the Point Reyes Seashore and Wilderness area, another \$70 million on the GGNRA, and currently proposed is a development plan for the next ten years in the amount of an additional \$90 million, a total of \$220 million spent by the Federal government to protect the unique environmental qualities of the area. I would think the Federal government would be eager to protect this investment by deleting these tracts. I would further think that this investment would at least be mentioned in the draft Environmental Statement.

It does not seem consistent that offshore drilling should be allowed in an area where the Federal government has taken such care to nurture and preserve the environment. Yet certain environmental questions still demand attention. The oil spill models assure us of minimal chances of a spill, but your oil transport schemes suggest the use of barges. I invite you to

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personally visit Cronkite Beach where two large barges washed aground in December. In light of this recent incident, can you really expect us to believe your statistics, your computer models and your optimistic conclusions.

The draft Environmental Statement has been called as a document "A sugar coating of the Federal Government oil industry plans to drill for oil off the coast of Northern California". It has been called "inadequate in documenting its conclusions" further evidenced by the possibility of the final Environmental Statement allowing major decisions on offshore drilling before the geologic and seismic studies are completed. The document has been called an attempt to justify rather than analyze the lease sale. Let me add to these findings in saying that the draft Environmental statement seems to be more concerned with preventing future lawsuits rather than providing a skeptical public with the information needed for an informed decision.

We have been consistently frustrated by the lack of responsiveness of the Interior Department in the Pacific OCS Office to local concerns. Even the process of establishing these local public hearings required extensive pleas to expand the hearing schedule. We were shocked and offended that the DES failed to consider any alternatives which deleted one or more basins because "conflicts were not persuasive enough to warrant exclusion of the basins". We have asked for these alternatives to be considered and, once again, gentlemen, we have been ignored.

The people of Northern California are grateful for the recent comments by the Secretary of the Interior which acknowledge our concerns, but we find his actions less than satisfactory. We must be shown that the conducting of an open process is more than a mock gesture to soothe the concerns of a noisy crowd. Please bring the Secretary our thanks for allowing these public hearings, and please bring him this message. We believe the

3.

three central California basins must be deleted from Lease Sale #53 and the two future leases. We are completely opposed to this portion of the sale and we will use every tool at our disposal to fight it.

Department of Environmental Management
Planning and Development Division



BOARD OF SUPERVISORS
EDWARD J. BACCIOCCO, JR.
JAMES V. FITZGERALD
ARLEN GREGORIO
FRED LYON
JOHN M. WARD

COUNTY OF SAN MATEO

COUNTY GOVERNMENT CENTER • REDWOOD CITY, CALIFORNIA 94063 (415) 334-5300 EXT. 4161

DAVID C. HALE
PLANNING DIRECTOR

July 1, 1980

William E. Grant
Pacific Outer Continental Shelf Office
Bureau of Land Management
1340 West Sixth Street, Room 200
Los Angeles, CA 90017

Dear Mr. Grant:

Subject: Draft Environmental Impact Statement - Proposed 1981 Outer
Continental Shelf Oil and Gas Lease Sale Offshore Central and
Northern California

Thank you for the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for Lease Sale #53. On June 17, 1980, the San Mateo County Board of Supervisors adopted Resolution 041096 supporting the State Coastal Commission's position, finding the DEIS inadequate for lack of information, and supporting Alternative 5--Cancel the Sale--as the preferred alternative. The Board also directed staff to submit comments to the Pacific Outer Continental Shelf Office of the Bureau of Land Management.

The enclosed package represents San Mateo County's review and comments. The comments are both general and specific and are intended to assist you in the preparation of the Final EIS.

The following additional information has been included for your use.

- o The most recent drafts of policies in the Local Coastal Plan to be approved by the County Board of Supervisors in July, 1980.
- o Wind data collected by CalTrans in 1975 onshore at Highway 92 and Highway 84 (Skyline Boulevard) in Central San Mateo County.
- o San Mateo County Energy Report Summary prepared for the Energy Task Force.

William E. Grant

July 1, 1980

- 2 -

- o San Mateo County Retrofit Ordinance.

- o The aforementioned Resolution 041096--Resolution Opposing Outer Continental Shelf Lease Sale #53 off the San Mateo County Coast.

If you have any questions concerning these comments, please contact Deborah S. Nelson of my staff at (415) 364-5600, extension 4161.

Sincerely,

David C. Hale
Planning Director

DCH:DSN:fc

Encl.

cc: Cecil Andrus
Secretary, Department of the Interior
18th and C Streets, NW
Washington, DC 20240

Frank Gregg, Director
Bureau of Land Management
Department of the Interior
18th and C Streets, NW
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Deni Greene, Executive Director
Office of Planning and Research
1400 10th Street
Sacramento, CA 95814

Michael Fisher, Executive Director
California Coastal Commission
631 Howard Street
San Francisco, CA 94105

Richard Charter
CEIP Coordinator for Local Governments

The following represents San Mateo County's comments on the DEIS - OCS Lease Sale #53.

General Comments

GENERAL APPROACH

The DEIS adopts a very general approach in the discussion of the environment and expected impacts. The approach is inadequate and must be corrected. This tone of generality leaves the impression that a specific alternative is being justified instead of a rational objective statement of the environmental impacts of the lease sale and its alternatives. San Mateo County continues to support a basin by basin analysis in Lease Sale #53, to determine specific environmental impacts to resources of National, State and local significance.

The DEIS gives heavy weighting to federal requirements and standards while in most cases dismissing similar state standards. For example little attention is given to the California Environmental Quality Act (CEQA), State Air Quality Regulations, State designated rare and endangered species, Local Coastal Programs, to name only a few.

INADEQUATE CONSIDERATION OF AREA SPECIFIC DATA

With the exception of local input at the scoping meetings (DEIS p. 1-7 thru 1-10) there has been little attention to the resource information provided to the POCs office both in response to specific requests for information (POCS, April 27, 1979) and on the Preliminary Draft Environmental Data Statement. Use of the information, which is specific to the resources of San Mateo County is essential in determining the impacts of developing the OCS. Analysis of the effects of leasing with respect to the policies of the federally approved California Coastal Management Program and the County's Local Coastal Plan is essential. The DEIS is inadequate in this respect and the result is incomplete consideration of special coastal resources such as scenic communities, recreation areas, wetlands, estuaries, bays, aquaculture operations, harbors and scenic areas.

Data has been submitted to the POCs office by many groups and individuals with specific expertise. Lack of incorporation of the data has resulted in a very general document which for the most part is not area specific. In this respect the document is inadequate. San Mateo County continues to support a basin by basin analysis of each of the five basins to determine specific environmental impacts.

THE DEIS IS INADEQUATE FOR LACK OF INFORMATION

Concerning:

- (1) Basin by basin analysis of each of the five basins to determine specific environmental impacts.

- (2) Results of funded environmental studies which will not be available for the proposed leasing decision including FY 1979 studies 1, 4 and 5 (DEIS P 1-55) concerning Oceanographic and Meteorologic data, Geological Hazards, and Marine Mammals and Birds and FY 1980 studies.

(3) Oil Spills

- a. Inadequate, incomplete data for oil spill prediction as results of studies on physical oceanographic and meteorological data not yet available.
- b. Inadequate analysis of mitigation measures necessary to improve "State of the Art" oil spill control which is not effective in the moderate seas, winds and currents of Central and Northern California.
- c. Inadequate analysis of the significance of the predictions in the Santa Cruz Basin for a 10% probability of a spill reaching the intertidal areas of the Fitzgerald Marine Reserve and a 20% "hit" to Pescadero Creek and Marsh, a significant sensitive habitat in San Mateo County.

- (4) Inappropriate measurement of local economic impacts through use of the Curtis-Harris Model.
- (5) Analysis of the effects of leasing with respect to the policies of the federally approved California Coastal Management Program or the County's Local Coastal Plan.
- (6) Lack of consideration in the Proposed Notice of Sale to include a consistency determination.
- (7) Consideration of special coastal resources such as scenic communities, recreation areas, wetlands, estuaries, bays, aquaculture operations, harbors, and scenic areas.
- (8) The proposed Point Reyes/Farallon Islands Marine Sanctuary and resultant exclusion of tracts within its boundaries.
- (9) Inadequate identification of tracts in which seismic hazards may either preclude oil development or warrant special mitigation. The sentence beginning at the end of p. 3-12 and continuing on p. 3-13 of the DEIS speaks to need to avoid areas of active geologic movement.

SAN FRANCISCO BAY

San Francisco Bay is discussed throughout the DES as providing support bases and processing and refining for OCS #53, particularly for the Bodega and Santa Cruz Basins. There are glaring inadequacies in the discussion of San Francisco Bay. It is primarily discussed in terms of Shoreline Segment 17. At the very least, the DES should consider impacts on the natural environment and expected impacts at service bases and processing and refining areas. San Francisco Bay Area is composed of 9 counties and 45+ cities that front the Bay and is in itself a unique resource composed of many sensitive marshes and the South San Francisco Bay National Wildlife Refuge adjacent to inland areas of San Mateo County.

CUMULATIVE IMPACTS

The discussion of cumulative impacts are generally biased in favor of the project and not written in the spirit of the law.

The California Appellate Court* recently made certain findings and rendered opinions on the adequacy of an EIR (Ventura County oil wells). The Court used both State and Federal case law. It is important, when evaluating a project, to look at the cumulative impacts. The following points are taken from the Court's determination:

"An EIR must include a description of the environment in the vicinity of the project as it exists before the commencement of the project, from both a local and regional perspective. Knowledge of the regional setting is critical to the assessment of environmental impacts. Special emphasis should be placed on environmental resources that are rare or unique to that region. Specific reference to related projects, both public and private, both existent and planned, in the region should be included, for purposes of examining the possible cumulative impact of such projects."

"The full environmental impact of a proposed federal action cannot be gauged in a vacuum. The standards of practicality and reasonableness by which the adequacy of an EIS must be measured surely dictate that the cumulative impacts of one project with other projects need not be set forth in the same detail as the direct impacts of that project. The same standards of practicality and reasonableness dictate that such cumulative impacts must not be ignored."

Three elements are necessary for an adequate discussion of cumulative environmental impacts:

- 1) A list of projects producing related or cumulative impacts;
- 2) A brief but understandable summary of the expected environmental impacts to be produced by those projects with specific reference to additional impact information where such information is available;
- 3) A reasonable analysis of the combined or cumulative impacts of all the projects.

*Whitman vs. Board of Supervisors, 88 Cal. App. 3d. 397 (January, 1979).

ALTERNATIVES

The OCS Lands Act calls for balancing orderly energy resource development with protection of the human, marine and coastal environments. If the spirit of this requirement were met, San Mateo County feels there would be no lease sale and at the very least there would be consideration of the following alternatives.

Onshore Oil and Gas Alternative

San Mateo County has three recognized oil fields onshore, Half Moon Bay, La Honda and Oil Creek. There are currently 9 wells in production and 15 wells in application. Resource estimates of the onshore reserves are available from the State Division of Oil and Gas and are discussed in the Energy Component of the

Local Coastal Program (pages 4-13 of the LCP). Onshore production should be discussed as an alternative for the Santa Cruz Basin and the entire lease sale.

Energy Conservation

San Mateo County, through the Energy Task Force, is developing policies and ordinances to reduce dependence on oil and gas resources. The savings realized should be compared with the costs to develop the offshore resource.

Deletion of Tracts for Seismic Hazards

Tracts should be identified and deleted where seismic hazards would preclude oil development.

Deletion of Tracts Based on the Traffic Separation Scheme

Where conflicts occur in the basins due to vessel traffic either based on the Traffic Separation Scheme or that proposed by the Pacific Merchant Shipping Association, specific tracts should be deleted. Mandatory deletion is necessary in the established vessel traffic lanes.

Specifically, San Mateo County supports deletion of the northern one-third of the tracts in the Santa Cruz Basin, as suggested by the Pacific Merchant Shipping Association.

Deletion of One or More Basins

If the DEIS was prepared to consider area specific data and discuss impacts in terms of each basin there would likely be shown that there are pervasive conflicts of OCS leasing which would lead to the deletion of one or more basins.

Specific Comments

<u>PAGE</u>	
1-11, g.	Consideration should also be given to State designated rare and endangered species.
1-24	San Francisco Bay is very large. Where are onshore operations expected to be located; Oakland, Richmond, Redwood City . . . ?
1-29	Last sentence: A DEIS is an informational document. Statements like this serve no purpose.
1-76	The Oil Spill model predicts 2.29 spills over 1000 bbls, to state "in the unlikely event that a major spill does occur" is ridiculous.
1-82	The Point Reyes/Farallons Island proposed Marine Sanctuary boundary also includes portions of tracts 069 and 073 in the Santa Cruz Basin.
2-3	The statement concerning studies concerning sublethal effects from drilling mud and cuttings is unclear. Does it mean there

Elephant Seal	San Mateo County	Federal: Protected State:
Guadalupe Fur Seal <u>Arctocephalus townsendi</u>	Ano Nuevo (one)	Federal: Protected State: Rare
Southern Sea Otter	Add: Occasionally San Mateo County	
Red Legged Frog	San Mateo County	Federal: Not listed State: Protected
California Brackish Water Snail <u>Tryonia imitator</u>	Pescadero Marsh San Mateo County	Federal: Proposed threatened State: Not listed
San Francisco Tree Lupine Moth <u>Grapholitha edwardsiana</u>	San Mateo County	Federal: Proposed threatened State: Not listed
San Bruno Elfyn Butterfly	Add: San Mateo County, Martini Creek	
Mission Blue Butterfly	Add: San Mateo County after San Bruno Mountain	
The following plant species should also be considered (San Mateo County LCP).		
<u>Species</u>	<u>Distribution</u>	<u>Status</u>
Garner's Yampah <u>Perideridia gairdneri</u>	Ano Nuevo Pebble Beach San Mateo County	Federal: Not listed State: Not listed
Hichman's Cinquefoil <u>Potentilla hichmanii</u>	Bluff above Moss Beach Possible Fitzgerald Marine Reserve	Federal: Proposed endangered State: Endangered
San Francisco Wallflower <u>Erysimum franciscanum</u> var. <u>franciscanum</u>	Pacifica	Federal: Proposed endangered State: Not listed
Yellow Meadow Foam <u>Limnanthes douglasii</u> var. <u>sulphurea</u>	Probably only sitting now extirpated San Mateo County	Federal: Proposed threatened State: Not listed
3-69 last sentence	Where information is available from LCP's (or Oraft LCP's) it should be incorporated. There is a wealth of data provided to the POCs office in the San Mateo County Oraft LCP.	
3-70	It would be more appropriate to use ABAG Series 3 projections.	

- are no studies or that the studies available show no conclusive evidence?
- The 20% probability of a hit at Pescadero Creek should be included.
- 2-4 top of page
- 2-6, e. "Rapid mobilization of clean up and containment teams" is not presently possible. There is no justification for this statement.
- Tourism will not be absorbed elsewhere, the lease sale area covers too large an area to reasonably make this conclusion.
- 2-7, e. Distance from shore may vary as does visibility due to elevation from which the structure is viewed. In addition, the stationary nature of platforms makes them obtrusive. The impact to a frontier, primarily Class A Scenic Coastline, is not minor.
- 2-7, P.4 This is contradictory to later statements which suggest that sportfishing vessels are not allowed near enough to platforms to notice any reef effect.
- 2-10, P.2 Space conflicts from transitory structures such as tankers will also impact commercial fisheries.
- 2-15, i. It should be pointed out that the 3 mile buffer reduces impacts on air quality by dilution.
- 2-21, P.1 The model does show a "hit" to shoreline segment 18, just north of the sea otter range. With offshore currents, isn't it likely that the otter could be impacted by a spill in the Santa Cruz basin?
- 2-24, iii Although the threat of oil spill from existing tanker operation still threatens the sea otter, the additional threat from Lease Sale #53 is not justified.
- 3-28, P.2 Restricted visibility from fog should also be discussed for the heavy traffic area between Pt. Reyes and Monterey.
- 3-29 Oxidant levels are discussed for the Cities of Riverside and Livermore which suggests that air quality must be discussed on a regional basis rather than by coastal segments.
- 3-62 Endangered species discussion should include federal status other than threatened and endangered and also include all recognized State species as well (see the San Mateo County LCP Sensitive Habitats Component). Just because some species do not have federal status does not reduce their significance in the lease sale area or the impacts to these species. The following animal species should be included:

<u>Species</u>	<u>Distribution</u>	<u>Status</u>
California Black Rail <u>Lateralus jamaicensis coturniculus</u>	San Mateo County	Federal: Not listed State: Rare

- 3-74 The Coastal Cities population is about 60,000 or 10%.
- 3-79, P.2 Principle manufacturing industry in the Santa Clara Valley has changed to the electronics industry.
- 3-98, v. San Francisco Bay and Delta is also important for Salmon spawning.
- 3-110, xi There are many more mariculture industries in the Lease Sale #53 area not mentioned here including Bodega Bay. It is important to point out the fragile nature of nursery stock and dependence of most operations on a clean water source. Both Pigeon Point Shellfish Hatchery and International Shellfish Enterprise, in Moss Landing, depend on water pumped from shore.
- 3-112, P.2 The sentence should be amended to reflect that oil and gas development could have a major impact on the proposed southerly access.
- 3-116,d.,P.3 State Highway 1 has a scenic route designation from the southern San Mateo County line to Half Moon Bay.
- 3-119, P.2 Name and location of the 8 underwater parks and 16 subtidal areas should be included.
- 3-123 Are the attendance figures in San Mateo County only for two State Parks? There are 14 State Beaches, the Fitzgerald Marine Reserve, and Butano State Park. Attendance figures should be adjusted to reflect these. Fitzgerald Marine Reserve had the following attendance in the last 10 years: 1970, 72,149; 1971, 84,865; 1972, 77,807; 1973, 76,540; 1974, 79,885; 1975, 79,831; 1976, 94,980; 1977, 93,010; 1978, 94,555; and 1979, 91,495.
- 3-144 thru 146 The following changes should be made to the Santa Cruz area.
- o Geohazards should include coastal cliff instability and landslides (see LCP Hazards Map).
 - o Marine Mammals - Ano Nuevo is host to the greatest variety of marine mammals found in Central California.
 - o Sea Birds - Also occur in rookeries on a number of offshore rocks.
 - o Major Wetland Areas - Include Pescadero Marsh and Pillar Point Marsh (LCP Sensitive Habitats Component).
 - o Endangered Species - San Francisco garter snake, least turn, black rail, brown pelican, San Bruno elfin butterfly, tree lupine moth, etc. (LCP, pages 7.26 through 7.29).
 - o Major Salmon Spawning Streams - Pescadero Creek and San Francisco Bay and Delta.
 - o Most Important Commercial Invertebrates - Include dungeness crab, red abalone.
 - o Cultural Resources - There are over 100 shipwrecks off San Mateo County alone (Source: San Mateo County Historical Society).

o Major Recreation Facilities - Add: Butano State Park, Fitzgerald Marine Reserve, Ano Nuevo State Reserve. If only the San Mateo County Coast is considered in the total shoreline, then the figure should be changed to:

56 miles of shoreline

23.7 miles - rocky shore

32.3 miles - beach

The suggestion that inevitable population expansion will degrade coastal habitats sound like justification for onshore development and does not consider either the coastal mandate or Local Coastal Program's intentions to preserve unique areas.

3-148

- 3-152, iii This section should reflect the policies of the County's Local Coastal Plan.
- 4-16 Shoreline Segment 19, Significant Categories - Include: Bean Hollow, pinnipeds and shore birds (Ano Nuevo), offshore rocks (Franklin Point).
- 4-19 Where is the discussion of impacts from the 150-230 oil spills under 1,000 BBL's?
- 4-21, a. Land use impacts associated with onshore facilities should be included.
- 4-23, P.1 Offshore structures will cause emissions of air pollutants.
- 4-25 Tankers and barges would cause emissions of air pollutants.
- 4-27 Effects of supply and crew boats traffic on T.S.S. should be discussed.
- 4-34 Discuss the significance of toxic substances discharged with drilling muds on fisheries, aquaculture, sensitive habitats and marine mammals and birds.
- 4-39 Discussion of the Environmental Consequences on Air Quality should reflect the California Standards for Air Pollution Control and existing onshore conditions.
- 4-51, P.2 ^mComparisons of pollutants emitted from the Santa Cruz and Bodega tracts with the existing Bay Area emissions is not justified.
Coastal areas next to these two Basins are no where near the emission levels of the greater Bay Area, given the lack of point sources and onshore breezes. Emissions from OCS development may be significant.
- 4-54, P.2 The discussion of beneficial increases in employment should be expanded to include the types of employment available to the local labor force on a basin by basin basis. It is unlikely that there are many people with drilling expertise in a frontier area.
- 4-57, P.2 It is interesting to note that the proposed pipeline route in the Transportation Scenarios, perpendicularly crosses the San Andreas fault.
- 4-58, 8 Should mention possible impacts from seismic activity.
3rd to last sentence
- 4-84, 2 Secondary effects to Commercial Fishing should be included in this discussion.
- 4-89 Fitzgerald Marine Reserve (not State Park) is a unique strip of submerged land and one of the largest inter-tidal reefs in California. In addition, there are at least two English, steel-hulled square riggers shipwrecked within the Reserve dating over 100 years old.

		2nd to last sentence - is contradictory of other statements concerning long term impacts. (See 4-119, last sentence.)
4-109, e.		Impacts on recreation are discussed in terms of increased pressure on existing facilities from increased population. San Mateo County beaches already serve millions of visitors per year. The real issue is the reduction in quality of the recreation experience.
4-111	4-136 thru 137	Discussion of hit probabilities on Segments 17, 18 and 19 should include consideration of reduced visitor attendance at Fitzgerald Marine Reserve and Ano Nuevo where the primary features are sensitive marine habitats. Will the 3-mile additional buffer change the percentages of 5, 17 and 3%. If not, why is not more effective mitigation proposed.
4-112, (1)		At worse case discussion should also consider the probability of hit in the winter when the primary recreation use is whale watching and observing pinnipeds at Ano Nuevo in Segment 19.
4-113, P.2	4-145	The 20% probability of spill should be further defined. Does the 20% refer to the day the spill occurs, 3 days, 10 days or 30 days later. There are both summer and winter heavy recreational use periods. For example, if a spill occurs at midnight in December, what affect will it have midday on Saturday in January at Ano Nuevo? A spill in winter at Ano Nuevo would eliminate all recreation use, which by the nature of the use, could not be absorbed elsewhere. (Effects on human recreation use are minor however compared to the direct impacts of oil pinnipeds.) <i>Dr</i>
4-116		It is not appropriate to justify a 20% probability of spill at Pescadero Marsh with the qualification that there is only 0-2% probability at other marshes in the Bodega Basin.
4-117, P.2		Include other impacted species, including those at Pescadero Marsh.
		If there is a 10% probability of spill within Segment 18, the impacts to the coastal resources should be seriously addressed. What impacts are expected to the down current Segment 19 which is also abundant with "significant categories of impact"? Effects of spill should also be discussed in terms of recreation of these areas.
		State designated species should also be considered.
		This table should at least include Ano Nuevo Island as an important offshore resource area. Two major onshore areas Pescadero Marsh (in Segment 18) and Ano Nuevo (in Segment 19) should also be included.
		There are several other marsh species with endangered status that should be considered as 'concentrated at a single location' and therefore highly susceptible to impacts from spill. State designated species should be included.
		of a
		There is a 20% probability "hit" at Pescadero Marsh, habitat of several significant species, including the California Beach Rail, California Least Tern ^{Br} and the Blackish Water Snail, yet there is no discussion of impact.

- 4-145 The statement that the impact of the proposal on recreation will be minor unless an oil spill contacts the shoreline is contradictory of the statement on the previous page that "oil spills will have the greatest impacts on sportfishing" which occurs on open areas.
- 4-146 The statement that cumulative impacts to general recreation will be insignificant is not substantiated.
- 4-144, 5. There should be some discussion of the effects to commercial fisheries from ingestion of contaminated species.
- 4-150 Crab trawling occurs close to shore in shoreline segment 17 and 18. Oysters in the mariculture operation at Pigeon Point require 25,000 gal/day of water pumped from shore for the algae culture to feed adults, larvae and seed oysters.
- The probability of an oil spill occurring in these areas is not low (particularly in Segment 18). These "highly susceptible" species could be impacted.
- 4-158 The fact that mariculture operation does not occur within the tracts is not the issue. Pigeon Point Shellfish Hatchery and International Shellfish Enterprises, in Moss Landing, use sea water for algae culture. ~~Tainted~~ water could have severe impacts!
- 4-160, 6. This section should include discussion of the T.S.S. vs. industry vessel lanes.
- 4-162 Cumulative Impacts. Include discussion of Pillar Point Harbor and Santa Cruz Harbor.
- 4-179 Visual impacts are played down in this discussion. Platforms are prominent and their visibility is dependent on distance from shore, elevation of the view and weather conditions and number of structures. It is appropriate for the discussion to include specific detail about the view from the shore and from the elevation of ^{spit} Hwy 1 adjacent to each basin. Although the Bodega Basin tracts may be further from shore, the most common view would be from the coastal bluffs.
- 4-184 Impacts on employment should be discussed in terms of the Coastside as well as the County as a whole.
- 4-186 The Coastal Commission designation is for areas NOT suitable for power plant siting. In San Mateo County, the entire coast west of Highway 1 has this designation.
- 4-191, d. Include-5) damage to the recreational experience in the list of adverse impacts on recreation.
- The special habitats at Ano Nuevo and Fitzgerald Marine Reserve and their associated species should also be considered as objects of recreation and tourism. A spill affecting these areas would impact the species and thereby recreation.

- 4-196 Again, it is important to consider the effects on state protected biological resources.
- 4-199, 13. All tracts within the Point Reyes/Farallon Islands proposed marine sanctuary should be deleted.
- 4-201, P.2
last sentence
To suggest "few long-term productivity or environmental gains are expected as a result of the proposed sale" unjustly masks the issue of expected environmental impacts.
- 4-212, IV Recreation, Estimated Loss Over Life of Field, Oil Spills, a - The 0.46 estimated spills represents a 20% probability of the expected 2.29 spills. This can hardly be termed minor.
- 4-212, 2. OCS structures, Impact Producing Agent, include: c. loss due to visual intrusion of platforms.
- 4-217, 2. The no sale, ^{alternative} result^s in status quo not loss of production.

and delay the sale

UNITED STATES GOVERNMENT

Memorandum

TO : Bureau of Land Management
Pacific Outer Continental Shelf Office

DATE: 2 July 1980

FROM : Glenn R. VanBlaricom
National Fish & Wildlife Laboratory, U. S. Fish & Wildlife Service
San Simeon, California

SUBJECT: Comments on DEIS for proposed OCS lease sale 53

Comments on Draft environmental impact statement, proposed OCS lease sale 53, compiled by the Bureau of Land Management, U. S. Department of the Interior.

By: Glenn R. VanBlaricom
Ronald J. Jameson

Wildlife Biologists (research)
California Sea Otter Project
U. S. Fish and Wildlife Service
National Fish and Wildlife Laboratory
Piedras Blancas Field Station
P. O. Box 67
San Simeon, California 93452
805-927-3893

Attached are comments we have compiled on the Draft Environmental Impact Statement for proposed OCS lease sale 53. Because of the nearness of the 3 July deadline for comments, we are forwarding our remarks directly to you, at the request of Mr. Ray Fritz of OCS Operations, US Fish and Wildlife Service, Washington, D. C. It is my understanding that Mr. Fritz will be forwarding comments on the DEIS on behalf of the USFWS.

Please contact us at your convenience if you have questions or if we can be of further assistance. Thank you.

1. Alternative no. 3 to the proposed action is intended to afford protection to the threatened California sea otter population. We believe the proposed alternative is inadequate to achieve the intended goal, and that alternative no. 2 to the proposed action, designed to reduce possible air quality degradation, is in fact a better plan for protection of sea otters than is alternative no. 3. The California sea otter population currently ranges from Pismo Beach to Santa Cruz, with the highest population densities at the ends of the range. Continued expansion of the range is likely. Thus, proposed OCS development of the Santa Cruz and Santa Maria basins will be in close proximity to dense concentrations of otters. Alternative 3 involves deletion of nearshore tracts only in the northern part of the Santa Maria basin. This provides no protection for the large group of otters currently in the Santa Cruz area, and does not offer any protection to the southern concentration once it moves south of the Pismo Beach area.

We recommend that alternatives 2 and 3 be combined as a single alternative plan which would provide protection for sea otters and other nearshore marine vertebrates as well as providing for reduced impacts to coastal air quality.

2. The DEIS does not adequately acknowledge the importance of sea otters in structuring nearshore communities, particularly kelp forest habitats. Sea otters are known to limit densities of herbivorous invertebrates wherever otters occur. Reduction of densities of sea urchins by otters has produced profound effects upon kelp populations and associated species in the Aleutian Islands, in southeast Alaska, and in central California. Because sea otters are thought to be highly sensitive to oil spill contamination, a large oil spill jeopardizes not only the threatened California sea otter population, but also the structural integrity of the nearshore ecosystems of which otters are such an important part. The final EIS should give more emphasis to this relationship.

3. The DEIS does not discuss certain aspects of sea otter behavior which make otters particularly susceptible to contamination from spilled oil. In the aftermath of the oil spill in the Santa Barbara Channel in 1969, two studies (references below) showed that large quantities of spilled oil "hung up" in the kelp beds of the mainland coastline and at Anacapa and Santa Cruz Islands. Because kelp beds are heavily used by sea otters

for foraging, resting, and grooming activities, the tendency for floating oil to accumulate in kelp beds poses a serious threat of contamination of sea otters in the event of a major spill. The final EIS should give some consideration to this problem.

References: Foster, M., A. C. Charters, and M. Neushul. 1971. The Santa Barbara oil spill. Part 1: Initial quantities and distribution of pollutant crude oil. Environmental Pollution 2: 97-113.

Turner, C. H. 1969. Cruise report 69A2. Inshore survey of Santa Barbara oil spill. California Department of Fish and Game, California State Fisheries Laboratory, Terminal Island, California. (copy on file at library, California Dept. of Fish and Game, Marine Resources Operations offices, Menlo Park, California).

4. Several mariculture and research operations exist within the area of the proposed action which would suffer possible damage from a major oil spill, but are not mentioned in the DEIS. These include abalone culture operations at Cayucos and Pigeon Pt. (private commercial operations), the state abalone culture laboratory at Granite Canyon (south of Carmel), and the U. S. Fish and Wildlife Service research field station at Pt. Piedras Blancas, near San Simeon (research on sea otter population dynamics and behavior, and on the relationships of sea otters and nearshore ecosystems). In addition, the California Dept. of Fish and Game has a continuing study of tagged sea otters throughout the range of the sea otter in California. The federal and state research projects are long-term efforts which could be severely impacted by a major oil spill under certain circumstances.

5. There are many important haul-out areas for the Harbor Seal (*Phoca vitulina*) within the area of the proposed action which are not discussed in the DEIS. We are most familiar with the area between Cambria and Ragged Point, somewhat to the north of the Santa Maria basin. Within this area we regularly see 300-400 seals hauled out on low-relief rock reefs near shore at low tide. We suspect that there are many more harbor seals using the exposed outer coast habitats of central California than is generally recognized. We urge further investigation of this issue before compilation of the final EIS.

6. We are skeptical of the results of various analyses used to assess risks of oil spills and to predict movement and fate of large amounts of spilled oil along the central California coast. In February 1978 a barge spilled about 2 million board feet of cut lumber (the equivalent of 29,000 bbl. of oil) about 40 km west of Pt. Sur. With the help of the U. S. Coast Guard we compiled information on the movements and fate of the spilled lumber. Within the next 30 days floating patches of lumber were seen from Monterey to Pt. Arguello, and lumber from the spill came ashore in large quantities from Carmel to Pismo Beach. The lumber spread through about 90% of the range of the California sea otter population. As a result, we are convinced that a major oil spill would result in large amounts of oil coming into nearshore kelp beds and onto the shore, even though prevailing winds tend to parallel the coastline in central California. We urge that drift card or drogue studies be undertaken, perhaps involving remote telemetry techniques, to gain a better understanding of the movements of floating materials along the central California coast. We suggest less reliance on simulation approaches based on data from oil fields elsewhere in the world.

7. Visual sheet no. 5 in volume 2 of the DEIS contains errors concerning the distributions of kelps in central California. For example, the visual shows the kelp forests between Santa Cruz and Pt. Ano Nuevo to be dominated by giant kelp (*Macrocystis*). In fact, giant kelp stands in this area are patchy and are interspersed with significant abundances of the bull kelp (*Nereocystis*). In addition, the relative abundances of these kelps can change dramatically from year to year depending on the severity of winter storm seasons. The visual shows the Pt. Buchon area to have large stands of both giant kelp and bull kelp. In fact, bull kelp is predominant in this area, with giant kelp occurring only in scattered patches at this time.

We hope that the above comments are helpful in the preparation of the final EIS for proposed OCS lease sale 53. We will be happy to provide additional information and assistance on these matters if requested.

Glenn R. VanBlaricom

Ronald J. Jameson

by:

John R. VanBlaricom

Department of Environmental Services
Planning and Development Division



COUNTY OF SAN MATEO

COUNTY GOVERNMENT CENTER • REDWOOD CITY • CALIFORNIA 94063

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(415) 364-5600, EXT. 4161

June 30, 1980

Mr. John Lane
Pacific OCS Office - BLM
1340 West Sixth St., Rm. 200
Los Angeles, CA 90017

Dear Mr. Lane:

You will find attached my comments on the Draft Environmental Impact Statement for the proposed Lease Sale 53. The comments are segregated into two sections which treat general and specific concerns regarding the inadequacy of the current document as a decisionmakers tool for planning staff at the local level and its failure to comply with the letter and intent of NEPA and with Section 18 of OCSIA as amended.

Thank you for this opportunity to comment on the DEIS for Lease Sale 53.

Sincerely,

Richard A. Charter

Richard A. Charter

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR PROPOSED OCS LEASE SALE #53

Written comments prepared by: Richard A. Charter
Planning Division
Government Center
Redwood City, CA 94063

Introduction:

Formal written comments have been requested by the Pacific OCS Office of BLM on the Draft Environmental Impact Statement (DEIS) on Lease Sale 53. These written comments have been transmitted to this office in compliance with the request.

Commentary:

After careful review of the DEIS for Lease Sale 53 I have found the document to be inadequate for the following general reasons:

- The DEIS is inadequate because it fails to address the full range of impacts associated with the proposed action, to identify all affected species, and to recommend adequate mitigation measures for unavoidable adverse impacts on the marine ecosystem, on onshore air quality and socioeconomic base, and on marine mammal populations and seabird habitats along the Central and Northern California Coast.
- The DEIS is inadequate because it fails to balance resource potential against relative environmental sensitivity and economic productivity of existing uses of the marine resource on a basin by basin basis in order to develop alternatives to the project which would allow for deletion from the proposal those areas with low resource potential and a high degree of environmental sensitivity. This basin by basin analysis has been requested repeatedly by numerous reviewers of the PDES and has still not been included in the DEIS. An alternative should be added which reflects this basin by basin analysis and proposes the following:

- ° Deletion of the Pt. Arena, Santa Cruz and Bodega Basins from the sale because of low resource potential and a high degree of environmental sensitivity and economic productivity from existing uses of the marine environment.
- ° Deletion of portions of the Humboldt Basin, i.e., all tracts shown to have pervasive impacts of OCS development on high productivity fishing areas, commercial species spawning grounds, and geohazards such as slumps and mass wasting, and hard rock bottom habitats where organisms would be adversely affected by drill cuttings. In addition, these areas should be clearly delineated in a visual in the FES and SID and proposed for exclusion from any sale affecting the Humboldt Basin. The sale proposal #53 for the Humboldt Basin should be delayed for at least two years to permit proper consideration of the geohazards situation in that basin, particularly because of the large number of medium to high Richter value earthquake epicenters which have been recorded from the offshore portion of that fault zone.

• Deletion of portions of the Santa Maria Basin, particularly those tracts identified in Alternatives 1 and 2 in the DEIS and in addition allowing a 12 mile buffer zone around the proposed underwater state park near Pt. San Luis, and finally the deletion of all P-12 tracts from the Santa Maria Basin to protect critical resources at San Miguel Island, Richardson Rock, and Wilson Rock. Leasing of the Santa Maria remaining tracts should also be delayed for at least two years due to the need for additional geohazards information and air quality impact information, i.e., expected acceleration analysis for the Hosgri fault, relationship of Hosgri to the San Andreas shear zone, inclusion of information from USGS Strong Motion Instrumentation Program, present O₃ periodic non-attainment of air quality regulations as baseline in San Luis Obispo County, and the cumulative contribution of OCS activities to an already critical problem, and air quality analysis does not address the allowable doubling every 3 miles and how this would affect ambient levels of photochemical smog components onshore.

- The DEIS is inadequate until it includes a table, preferably near the general introduction to the document, which clearly shows the status of all studies, underway and proposed, relevant to Lease Sale 53, and the date at which progress reports or draft studies documents are expected and explanations of how that particular study will be incorporated into the decisionmaking process at the FES stage.

- The DEIS is inadequate because it fails to provide a basin-specific type of analysis which is of a high enough resolution to permit local planning staff to assess degrees of impacts on coastal micro-economies as well as coastal land use strategies or on maritime industrial activities such as shipping, commercial fishing, or tourism. The DEIS needs to be more accurate in terms of data-gathering at the local level (much information has been provided to the BLM staff by local governments and to date has apparently not been included as an information source for the environmental assessment). In particular, more care should be taken in the following areas of the DEIS:

- 1) Data gathered for the oilspill risk analysis should reflect more localized wind data, in taking wind data from distant sources the oilspill trajectory models ignore the fact that wind may be the major driving force on a spill trajectory, but that wind data is often only relevant to a basically very localized situation.
- 2) That the Winzler-Kelley document states that the Curtiss-Harris economic model is inappropriate for the utilization to which it has been put in the DEIS.
- 3) That current data, possibly available from the CASE meteorological buoy system in the future, must be incorporated in the spill trajectory analysis for the FES for it to be an even remotely relevant document. The DEIS and the FES can not be adequate until the Consolidated Geotechnics buoy study is underway and initial evaluations have been made of at least 3 years of data. The most recent estimate for this program seems to indicate that placement of the buoys could take place as early as this fall. September 1, 1980 the first buoy would perhaps be in place with subsequent buoys installed after that date, and that at least

a minimal period of approximately six months from date of installation of the buoy array must elapse before the data tapes can be recovered and analysis begun.

- 4) The DEIS is inadequate until it contains a detailed chart showing comparative carbon fixation rates in various worldwide upwelling situations, including basin-specific information for the Sale 53 area so that relative productivity of the marine resource can be accurately gauged.
- 5) In addressing possible impacts in the Humboldt Basin tracts, the DEIS is inadequate in that it fails to discuss the probable impacts of the kerosene range hydrocarbons in the event of a natural gas blowout or accident in the Humboldt Basin tract area.
- 6) The DEIS is inadequate in that it fails to incorporate the results of the Oil Toxicity Study now underway. Attention should be paid to addressing all lethal and nonlethal effects of hydrocarbons on not only seabirds and fish but also on planktonic organisms and on all commercial and non-commercial species of fish, including ppm/ppb concentrations at which eggs are killed in the free-floating state.
- 6) The DEIS is inadequate and the FES will be inadequate because the BLM-funded geohazards study cannot be completed in time to be included in the accelerated FES timetable for Sale 53. The Geohazards preliminary report is not due until August, but the FES will be being printed already when the first Geohazards report comes out.
- 7) The percent of hydrocarbon emissions which could be eliminated by requiring pipelines should be included in the FES for it to be adequate.
- 8) Is the cost of spill cleanup factored into the cost-benefit ratio for the project? Where in the DEIS is an indication included of how and in what manner straw used in large and small spill cleanup operations would be disposed of after use?
- 9) NEPA requires a net energy analysis of activities of this type. Nowhere in the DEIS is there a discussion in depth of the amount and kinds of energy required to a) construct and transport platforms to the sites, b) conduct exploratory drilling operations, c) transport crews and materials to the sites, d) transport hydrocarbon resources which might be found to refining/processing centers, d) construct, maintain, and refit onshore processing and refining facilities to accommodate high-sulfur crude, e) maintain and activate spill cleanup equipment and scenarios, f) construct and operate pipelines and OS&T vessels.
- 10) A risk analysis of various transportation scenarios is not included, therefore the DEIS is inadequate. The increases in hazard associated with OS&T operations, marine transportation with small barges and tankers (probably older ones), and a large number and frequency of vessel movements parallel to the coast are not addressed in the DEIS.
- 11) A risk analysis for San Francisco Bay and the lower Delta must include a detailed delineation of the complex circulation patterns of that body of water. The DEIS is inadequate in this regard because it fails to state that the greatest percentage of high-hazard transport of crude oil would be into the bay, in small barges and tankers, and that the number of vessel trips for the purpose of transporting crude oil into the bay would increase by a factor of four or five.
- 12) Small shoreline impact assessments associated with the areas north of San Francisco Bay reflect an inadequate DEIS. The lack of local data on nearshore currents, the northerly current regime coming during certain months, the gyres associated with headlands and points as well as the extreme sensitivity of the intertidal zones of this

northern area require that the shoreline segments also be delineated and the probabilities of shoreline oilspill impacts be indicated as has been done for other areas.

- 13) An analysis of the effects of dispersants such as Exxon 95-27 and BP 1100-D on the cell walls of marine animals should be included in the FES if it is to be adequate. In addition the effects of these dispersants on birds should also be indicated. It seems that dispersants are considered the first line of defense in the event of a spill in one of the Sale 53 Basins, and the side effects of the use of these agents should be noted in the FES.
- 14) In identifying the "need for sale" at the beginning of the document, an adequate FES would have to identify the following alternatives to the proposed action in order to be an adequate document with respect to alternatives.
 - a) The percent contribution of even a high-find scenario of development and production in offsetting total petroleum imports with domestic production. The FES is inadequate without this quantification for comparative purposes on the part of the reviewer.
 - b) The FES is inadequate unless it addresses the goals and policies of the State of California Geothermal Plan.
 - c) The FES is inadequate unless it addresses the commitment and concurrent documented accomplishments of the people of the state to conservation of fuel, something which has already happened and is not reflected in the DEIS.
 - d) The FES is inadequate unless it discusses the commitment of the people of the State of California to renewable energy resources, and the accelerated program to implement solar space heating and DHW (Domestic Hot Water) systems on a rapid basis with various incentives.
 - e) The FES is inadequate unless it addresses the fact that conservation is the cheapest way to back out imports from foreign suppliers, just by cutting end use consumption. Other economic benefits of conservation strategies available now and being implemented now (such as the Santa Clara County Solar Ordinance) must be discussed in an adequate FES.

- 15) The "no project" alternative is not discussed in enough depth to permit objective analysis in the DEIS. It is, after all, the status quo, and as such deserves equal consideration with each of the project alternatives which presupposed a need to proceed immediately.

- 16) The DEIS is inadequate because it fails to include site-specific data on unique features which could be considered very sensitive to OCS-related impacts. For instance, Tomales Bay, which is on the San Andreas fault line, has extreme tidal flows in and out of it and is also a unique and probably the most sensitive feature on the central coast. Difficulties in spill cleanup could be anticipated to be great for this and other wetland-type features, and should be discussed in some detail.



United States Department of the Interior

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New York Outer Continental Shelf Office
Federal Building, Suite 32-120
26 Federal Plaza
New York, New York 10007

IN REPLY REFER TO

1784.3

JUN 30 1980

Memorandum

To: Assistant Director, Energy and Mineral Resources (510)
From: Manager, New York OCS Office
Subject: Intergovernmental Planning Program (IPP)

We have been working closely with two separate Regional Technical Working Groups since October, 1979. The two groups have widely different "personalities", expertise, and concerns. Our recommendations and comments, submitted in response to your memorandum of June 5, are based on our experience to date with these groups.

1. Phase/Step Approach

We have found the four-phase, detailed step approach contained in the IPP document to be unworkable. Each region has unique concerns and diverse problems; the number of annual sales, the overlapping of sales within regions, and the history of the leasing program vary greatly from region to region. For these reasons a rigid framework of phases and steps cannot be followed.

Specifically, we have had problems in attempting to use the phased approach to transportation planning in the Mid-Atlantic. We have had to play catch-up because two sales had already been held in the Mid-Atlantic before the working groups were formed. Now we are in the pre-leasing stage for the third Mid-Atlantic sale (#59). Much of the transportation planning that is underway for Sale #40 will provide a base for transportation planning for Sale #59; it is impractical therefore to revert to following detailed steps for #59.

There are also difficulties in trying to lock in to the Phase/Step approach when identifying studies needs. Neither of our working groups was able to identify studies needs for transportation planning. The development of a Regional Transportation Studies Plan (called for in Phase II) was a specific agenda item for two meetings. The Mid-Atlantic Working Group questioned the need for any additional studies and recommended that we use existing information to draft a Transportation Management Plan. The North Atlantic Working Group also expressed a need to know what information is currently available before identifying additional needs. (See our comments on technical expertise of members.) We, therefore, have not developed a Regional Transportation Studies Plan for either region.

Save Energy and You Serve America!

We recommend that the Phase/Step framework be eliminated and that future guidelines/documents prepared to describe or explain IPP emphasize the there are three distinct areas for the working groups to provide advice: pre-leasing, environmental studies, and transportation planning. Information about the timing and products expected should be included.

2. Structured Outline for Transportation Planning

A "structured outline for transportation planning" will reduce the working groups' effectiveness because of regional and group differences. For example, in the Mid-Atlantic we are preparing a sub-regional Transportation Management Plan (TMP) initially. This approach was based on a recommendation of the working group, the current status (and anticipated developments) of drilling in the region, the capabilities of the working group, and the availability and status of pipeline and related studies at the federal and state level in the region. A similar approach may be totally inappropriate in another region because of differing circumstances.

At least in the Mid-Atlantic, the idea of having the working group actually prepare the transportation management plan is not valid. An advisory committee structure (whether called a committee, task force, or working group) is not conducive to the detailed preparation of plans. Members simply do not have adequate time to devote to the IPP as the program was initially conceived. It is difficult enough to get most members to review a minimal amount of information prior to a meeting.

As a result, the New York OCS Office staff will prepare the TMP with input, review and revision by the working group as a group and by individual group members with particular expertise. This conforms with the policy statement of 43 CFR 3340.0-2.

3. Size of Working Group

We fully support the idea of using subgroups when appropriate. The working groups are so large with such diversity in knowledge levels that meaningful recommendations often cannot be developed. For the IPP to be effective, there is a need for flexibility in managing the working groups. Subgroups can be especially useful when, as often is the case, there are several members with the expertise and willingness to work who can accomplish a great deal as a small group. Serious consideration must be given to reimbursing members for travel expenses incurred during meetings of subgroups. We also need the flexibility to have subgroups meet without the necessity of public notice and transcripts.

We endorse liberal use of the review-and-comment-by-mail approach to getting recommendations. It is not always necessary or even advisable to have a meeting when recommendations are needed. There is evidence that advisory committees are often most effective when the number of full committee meetings is kept

to a minimum and member input and even committee consensus is achieved through effective mailouts. This technique is especially well suited to the IPP because the groups are large and the membership diverse. It also helps the OCS Office conform with tight budget constraints and time schedules. We have used this technique with some success in obtaining ideas on studies needs for our environmental studies program.

4. Technical Expertise of Members

Some members do not meet our initial expectations in forming a group of "technical experts". Much time is spent at meetings in educating the members not only in the basics of the OCS oil and gas program but even in the very technical areas where they are supposed to advise us. We recommend a review of the procedures for selecting members with a view toward being more selective and, as members resign and new ones are appointed, choosing more specialists and fewer generalists.

5. Exchange of Ideas

The IPP has been in operation for nine months now. Each office has undoubtedly experienced some successes and some failures in managing the program. We recommend a meeting during the first quarter of FY 1981 of the IPP Staff (540) and people directly involved in IPP in each field office, so that experiences and successful approaches can be shared. We agree that each region has many factors which make it unique, however an open discussion of strategies that have made the program work in the various regions would be beneficial to all.

Frank Basile

Frank Basile

cc: Manager, Alaska OCS Office
Manager, New Orleans OCS Office
Manager, Pacific OCS Office

CALIFORNIA COASTAL COMMISSION CENTRAL COAST REGIONAL COMMISSION

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June 30, 1980

Mr. William E. Grant, Manager
 Pacific OCS Office
 Department of Interior
 Bureau of Land Management
 1340 W. 6th Street, Room 200
 Los Angeles, California 90017

Dear Mr. Grant:

The following comments are directed to the Department of Interior's Draft Environmental Impact Statement for the proposed 1981 Outer Continental Shelf Oil and Gas Lease Sale No. 53 offshore central and northern California. The comments are both specific (by page number) and general and have been prepared, in part, to facilitate your agency's response in the Final EIS.

The comments to the Draft EIS have been subject to the review and unanimous approval (one abstention) of the Central Coast Regional Commission. Resolution III-80-15 recommends both deletion and delay of certain basins and tracts within Lease Sale No. 53 as a result of the Draft EIS and to bring about consistency with Chapter 3 of the Coastal Act.

Thank you for the opportunity to comment on the work to date concerning OCS Lease Sale No. 53. The Regional Commission looks forward to completion of the Final EIS which addresses the comments expressed herein.

Very truly yours,

E. Y. Brown
 Edward Y. Brown
 Executive Director

cc: Hon. Leon E. Panetta
 Hon. Henry Mello
 Pam Aronhal, Office of Planning and Research
 Mari Gottliener, State Commission
 Richard Charter, Local Government Coordinator
 Deborah Nelson, San Mateo County
 Mary Ann Johnson, Santa Cruz County
 Mike Ricker, Monterey County
 Steve Russell, City of Santa Cruz
 Michelle Boyd, City of Capitola

EYB:ww

SPECIFIC COMMENTS

- 1-20 It is not clear exactly where the "existing" pipeline route is located from the coast to pipelines leading to refineries from the Santa Cruz area to San Francisco refineries.
- 1-31 This section is to focus on the "balancing" of orderly resources development and environmental protection. It fails to convince the reader of its intention in light of incomplete data, conflicts between agencies and lack of understanding of local, state and federal legislation relating to environmental regulations.
- 1-55-56 Past and current BLM OCS Studies in Central and Northern California.
- 1 of 1 1978 - Study yet to be completed
 - 8 of 8 1979 - Studies not completed
 - 6 of 6 1980 - Studies not completed
- In light of these absent studies, a final EIS cannot be prepared as to be consistent with applicable laws.
- 1-72 No analysis in the DEIS speaks to oil spill containment and removal capabilities of the responsible agencies (EPA, USCG). The DEIS admits that due to distances from oil spill equipment, there is no immediate response. But there will exist, before development of Sale No. 53 a required oil spill response program of trained personnel, equipment and expertise. BLM staff must develop the required oil spill plan subject to public input prior to the final EIS. A mitigation plan must be known prior to the sale if it is, in fact, to be a true mitigating action.

- 1-73-75 Payment of compensation for economic loss in no way can be construed as a compensation from a change in social dislocation (i.e., a fisherman to factory worker as a result of an oil spill).
- 1-76 OCS Orders 2, 5, 7 & 8 deal with preventive equipment as part of drilling equipment. OCS Orders 2, 5, 7 & 8 do not deal with oil spill contingency planning. An oil spill contingency plan needs to be developed for public review and inclusion in the final EIS.
- 2-3 The lethal and sublethal effects from formation water on the local biota should be known prior to any sale.
- 2-3 If a larger spill were to occur and an estuary, wetland or sea otter habitat were affected, major ecological losses would occur, not could occur.
- 2-6 The assumption if a spill were to occur at one location (no area defined), tourism would be "relatively unaffected" as tourism would "tend to be absorbed by the rest of the sale area" is an erroneous assumption. This assumption is grossly inaccurate and is representative of the illogic that is pervasive throughout the document. The sale "area" is some 700 miles in total length and an oil spill "in one location" would result in severe loss of tourist activity (also, a severe loss to the local economy) to the area and require prospective tourists to consider travelling greater distance for a different tourist activity (given the variety of recreational activity that is unique to California).
- 2-7 Oil spills will adversely impact sport fishing if they occur in a sport fishing area, or the oil spill moves into a sport fishing area.
- 2-7-8 A traffic separation scheme need be established as a stipulation to offer a degree of safety from increased vessel activity.
- 2-12-15 The alternative to delete 17% of the Santa Cruz tracts which result in a 50% reduction in onshore worst case air quality impacts, still results in an additional adverse air quality impact in the air basin which is presently identified as a non-attainment area and is presently in violation of local Air Pollution Control District standards.
- 2-15-16 There exist contradictory statements regarding the benefits from the subject alternatives. Page 2-15 states the additional distance of 3 miles will allow for weathering of a spill and a greater chance of missing the coast altogether. Page 2-16, 3rd paragraph, indicates changes in recreational impacts will be minimal as a result of the additional 3 mile buffer, but that it would take 3-6 hours more to arrive. Please clarify this contradiction.
- 2-22 An alternative which reduces the chances of sea otter population being affected within 3 days of a spill from 91% to 99.1% must be considered a mandatory alternative given the "rare and endangered" classification designated to the sea otter by Federal legislation. It should be noted, a major consideration in the selection of the sea otter to its rare and endangered classification is the existing off-shore oil tanker transportation route.
- 2-25 Not holding the sale would result in removal of a 30-day supply of crude oil to the entire nation's supply. This 30-day supply would hardly result in short term or long term impacts to the nation's energy needs. The area encompassing Lease Sale #53 should be placed in a National Oil and Gas Reserve for development only in time oil and gas reserves drop to a level that would be a threat to the national interest.
- 2-28 Delaying the sale for purposes of completion of environmental data prior to offering tracts for sale would be consistent with meeting the "balancing" between resource development and environmental concerns as required by the OCS Lands Act. As proposed, Lease Sale #53 does not meet the "balancing" requirement mandated by the OCS Lands Act.
- 2-29 The statement "...possible impacts on coastal and marine resources can be mitigated by OCS operating orders and lease stipulations." is inaccurate as a substantial amount of environmental data (reports for 1980 and 1981) will be completed after the Final Environmental Impact Report. The yet-to-be-completed Environmental Studies may result in additional operating orders and lease stipulations which would mitigate adverse impacts and would be consistent with the "balancing" requirement of the OCS Lands Act.
- 3-1-19- Geologic Description: this section is inadequate and reflects the real need to wait for the findings of studies yet to be completed (Geological Hazards Study, Northern California - 1980)
- 3-66 This Table indicates that one acre of land in San Mateo County is in "Recreational" use while both Monterey and Santa Cruz Counties have no acreage in "Recreational" land use. These figures indicate the internal inconsistency (compared with figures cited in pp. 3-118 to 3-128) that exists throughout the Draft EIS with a variety of subjects. These figures are in gross error and substantiate concerns expressed by local governments that local government data supplied to Pacific OCS offices were not utilized.
- 3-68 This Table indicates there exists No Residential, Commercial or Industrial land uses within Santa Cruz and Monterey Counties. Again, this is a gross error.
- 3-71 The BLM funded study due in 1981 entitled "Assessment of Space and Use Conflicts on the U.S. Outer Continental Shelf Between the Oil and Gas Industry and Commercial and Recreational Fishermen" need be utilized in determining impacts prior to and need be included in the Final EIS.
- 3-73 This Table indicates a 22.4% increase in population in Santa Cruz County from 1970 to 1975. When the estimated population of 1979 from this Table is compared to Table III.D.2.b-1 (Projected Population and Economic Base in 1990 Without Sale No. 52, p. 3-156), population for Santa Cruz County is estimated in 1990 as 112,483; This represents a decrease in population of 36%. This reduction in population from 1975 to 1990 cannot be considered correct, especially in light of a 22.4% increase in population from 1970-75.

Again, it appears the authors of the document exhibit biased findings that permeate the Draft EIS for the purposes of meeting time constraints established by DOI.

- 3-74 This Table cites a population of 521,000 (80%) within coastal cities of San Mateo County. This figure is inaccurate.
- 3-111 A Traffic Separation Scheme (TSS) need be approved and implemented for Central and Northern California prior to and included in a Final EIS as mitigation to the threat of tanker collision with platforms or other tankers.
- 3-145 Wetland areas in the Santa Cruz area of Elkhorn Slough, Bennett Slough, Corcoran Lagoon and Pescadero Marsh, etc., need be identified.
- 3-148 Inclusion of the statement "with the inevitable population expansion and development along wetlands and the coast, some corresponding degradation to coastal habitats is expected" reflects the lack of knowledge of regulatory protection measures established by State agencies such as the Coastal Commission and Department of Fish and Game.
- Also, the finding that "the lessening of detrimental impacts as the result of having one fewer spill within 30 years is probably insignificant" (if Lease Sale #53 were not offered) is hypothetical and worse - incorrect. These erroneous assumptions lead to false conclusions as indicated on this entire page and as contained in other areas of the Draft EIS.
- There is also insufficient data given in this report to demonstrate how impacts of oil spills would remain the same without this Lease Sale. This argument needs to be developed in more detail, in order to make this conclusion believable.
- 3-152 The possibility of "rapid and extensive growth" in the Half Moon Bay area is erroneous in light of Coastal Act policies and previous Coastal Commission permit actions to limit public works (sewer, water, street) projects consistent with the Coastal Act.
- 3-157 Santa Cruz Harbor does not have the physical capability to expand to accommodate any Lease Sale # 53 type activities. There is also no mention of Pillar Point Harbor.
- 4-1 Oil Spill Modeling: the use of available information to "drive" the model is inadequate and renders the results of oil spill modeling useless. One major flaw of the "available" data is, it is based upon only five U.S. Weather Service Stations supplying meteorological data. Only three of the five are located within the area of Lease Sale #53 and all are on land. The use of this data to predict water currents from three land based meteorological stations, three miles and beyond is useless.
- 4-21 On-shore impacts are described as "temporary", but some of the structures and activities would occur over the ±30 year expected life of Lease Sale #53.
- 4-23 The Draft EIS has previously indicated Lease Sale #53 could result in 2.29 oil spills during ±30 years of production. The term could is an attempt to evade the issue. The entire page is rife with the term could where the appropriate result of the subject matter (platforms, vessels, drillships, etc.) would occur.
- 4-43-51 The entire section on Air Quality and Emissions is void of any discussion of State standards and local air pollution control standards by which OCS activity need be evaluated. There is no discussion concerning the designation of the on-shore areas from the Santa Cruz tracts as existing non-attainment areas which are presently in violation of local standards.
- 4-59 The size of tankers entering San Francisco Bay is not limited to 30,000 dead weight tons.
- 4-64 It seems extremely simplistic to assume that adverse meteorological conditions will not occur simultaneously with excessive tanker and ship traffic in the same area.
- 4-82-83 The discussion of municipal or dairy land wastes into ocean waters has no relation to OCS impacts on water quality.
- 4-82 The Conclusion states that acute effects should not be significant. Acute effects are significant and should be treated as such. Lack of data does not justify such sweeping conclusions.
- 4-93 The Southern sea otter is an "endangered" species, not merely threatened.
- 4-112 There exists a jeopardy to the continued existence of the rare and endangered Southern sea otter, California clapper rail and the salt marsh harvest mouse due to an oil spill resulting from Lease Sale #53 development.
- 4-115 A discussion concerning existing environmental pollution of San Francisco Bay is not a consideration in OSC impacts to water quality. It is this logic, i.e., it is not pristine, so if an oil spill were to occur as a result of OCS, it will not be a significant impact, that prejudices the Draft EIS.
- 4-117 The "high ecological losses to sea otters and estuaries or wetlands" as well as losses to the endangered California clapper rail and salt marsh harvest mouse due to an oil spill resulting from OCS Lease Sale #53 are not acceptable.
- 4-119 The statement "marine mammal and seabird populations should not be affected significantly by cumulative OCS activities related to oil spills (assuming spill frequency projected by the oil spill model remains valid)..." is contradictory to conclusionary statements made on page 4-117 (see above). This inconsistency is not an isolated incident, but unfortunately, a situation that occurs at an alarming rate throughout the document.

- 4-196 The example cited, "...conversion of a wetland to another use" is but another example of ignorance to existing State laws as enforced by the California Department of Fish and Game and the Coastal Commission.
- 4-196 The irreversible or irretrievable commitment of fish and wildlife resources and their habitats (including the rare and endangered sea otter, California clapper rail and salt marsh harvest mouse) due to an oil spill is not acceptable.
- 4-217 What is the significance of a ±30-day national supply of oil (USCS estimates for Sale No. 53) to national economic and energy production goals?
- 4-217 The direct impacts from the No Sale alternative need to address other than oil dependent alternatives to Sale #53.

4-122 The Curtis Harris Model is not refined enough to determine impacts within a county's immediate coastal area. This inability renders the Model useless for its intended purposes. The failure of the Curtis Harris Model to address impacts at the coastal community level results in erroneous conclusions (i.e., page 4-126, 2nd paragraph), "Cumulative impacts would tend to concentrate relatively more people in coastal regions and increase economic activity to a minor extent." A report prepared by the Association of Bay Area Governments (ABAG) under contract with BLM (Contract #N010-CT9-2), utilizes ABAG's Basic Employment Model (BEMOD) and Projective Land Use Model (PLUM) which allow for assumptions about unique locations of basic economic activity. The ABAG Report indicates substantial conflicts with existing coastal community policies and OCS on-shore support facility requirements. As any development of OCS-related on-shore facilities would require approval of all local authorities, and the Harris Model does not consider impact to or from communities within the coastal zone, it would appear the Harris Model results are not reflective of localized inputs and results in erroneous conclusions.

4-145 An explanation of oil spill contingency planning and its adequacy needs be developed for inclusion as a Stipulation in the Final EIS.

4-146-147 The findings that impacts from oil spills to General Recreation and Sportfishing is insignificant, is not substantiated by factual data.

4-158 Use of an erroneous conclusion ("Fish and invertebrate populations are already stressed by heavy fishing pressures, and industrial, agricultural and domestic pollution. The cumulative impacts of proposed Sale No. 53 added to these factors would probably be very minor, except for salmon.") once again is reflective of BLM's bias input.

Further, the conclusion is inconsistent with data contained in Table III. A.1.d-1 (page 3-34) which cites 1/2 of locations tested have good to excellent water quality. Also, the conclusion is ignorant of mandates of the Federal Water Pollution Control Act and specifically Section 208 of the Act which addresses the specific water quality problems identified in Table III.A.1.d-1.

4-160 Impacts on shipping will occur as a result of Sale No. 53, not could occur. If transportation scenarios are believable, there will be increased activity in shipping, as previously cited.

4-180 As Sale No. 53 is a frontier area, significant visual impacts from platforms with a ±30 year duration, offshore vessels, air traffic and water quality will result. Also, these impacts are not "transitory, short-term impacts".

4-88-194 The unavoidable adverse impacts cited to air quality and water quality and the detrimental effects to marine and coastal ecosystems, recreation and sport fishing, commercial fishing and navigation are not acceptable given the resource potential.

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GENERAL COMMENTS

Staff has reviewed the Draft EIS for proposed OCS Oil and Gas Lease Sale No. 53 offshore central and northern California and finds:

1. The format of the document as expressed in the Table of Contents is unusual as it cites mitigations to possible environmental impacts prior to identifying the affected environments and identifying the environmental consequences of the project.
2. The format results in content which leaves the reader with the impression the authors are attempting to justify the project rather than conduct an objective analysis of impacts resulting from the project.
3. The analysis of impacts, as a result of the format and content is at best weak, and worst - biased. The document does not state impacts to the environment (use of could, may or possible as descriptive terms). The document fails to objectively state the impacts resulting from the proposed project.
4. The document is internally inconsistent and varying conclusions in certain areas are at odds. Erroneous assumptions which lead to incorrect conclusions are utilized throughout the document. These inconsistencies and errors are apparently due to insufficient background material (yet to be completed), an unrealistic time schedule established by DOI and the attempt to evaluate five separate and distinct regions having diverse economies, societies, and physical environments. As a result, the document fails to meet the "balancing of orderly resource development and environmental protection" as required by the OCS Lands Act.
5. The alternatives to the proposed action have not been fully analyzed. No consideration is given to:
 - o Deletion of any one complete basin (Santa Maria Basin is estimated to contain 75% of total oil resources of the five distinct basins).
 - o Classification of OCS No. 53 as National Oil and Gas reserve for future use.
 - o Onshore development.
 - o Energy Conservation.
 - o What specific effects deletions of all, or individual basins would have on Federal Energy Policy.
6. The modeling efforts chosen (Oil Spill Trajectory and Curtis Harris Economic) utilize insufficient data to result in meaningful forecasts.

RESOLUTION NO. III-80-15

On the motion of Commissioner Leavy duly seconded by Commissioner Wyman the following resolution was adopted:

RESOLUTION TO DELETE THE SANTA CRUZ BASIN TRACTS AND TO DELAY THE LEASING OF THE NORTHERN PORTION OF THE SANTA MARIA BASIN TRACT FROM OCS LEASE SALE NO. 53

WHEREAS, the United States Department of the Interior is charged with administering the mineral development of the Outer Continental Shelf under the OCS Lands Act of August 7, 1953 (67 Stat. 452; 43 USC: Sections 1331-1343) and the OCS Lands Act Amendments passed by Congress September 18, 1978 (92 Stat. 649; 43 USC: Sections 1344-1348); and

WHEREAS, the Department of the Interior has proposed leasing of tracts in five basins off the coast of Central and Northern California in May of 1981, known as Lease Sale 53, and

WHEREAS, the Santa Cruz Basin Tracts and the northern portion of the Santa Maria Basin Tracts are located in close proximity to numerous natural coastal resources within the jurisdiction of the Central Coast Regional Commission; and

WHEREAS, the Bureau of Land Management has prepared the Draft Environmental Statement for Lease Sale 53; and

WHEREAS, the Central Coast Regional Commission has adopted resolutions in the past opposing Lease Sale 53 (Resolution No. 78-116, June 5, 1978) and the five-year Lease Plan as proposed, (Resolution No. III-80-6, February 11, 1980) for various economic and environmental reasons; and

WHEREAS, thus far Central Regional Coastal Commission concerns and input have been disregarded by the Department of the Interior in the Draft Environmental Impact Statement in their refusal to at least delay consideration of Lease Sale 53 until adequate environmental studies have been completed; and

WHEREAS, it remains clear that the Department of Interior cannot adequately evaluate the potential impacts of offshore oil development in five widely separate geologic basins in a report limited to 300 pages; and

WHEREAS, the Draft Environmental Impact Statement is inadequate in its analysis of potential impacts on the Central California coast from offshore oil and gas development and resultant oil spills to: Air quality; marine birds and mammals, recreation; environmentally sensitive habitats, scenic and visual quality, commercial fisheries, archaeological and paleontologic resources and availability of areas for required onshore facilities; and

WHEREAS, the Draft Environmental Impact Statement is further inadequate as required environmental documentation concerning geologic hazards, meteorologic conditions, marine mammals and seabirds, commercial and sport fish oil toxicity and risk analysis to protected marine and coastal habitats have yet to be completed; and

WHEREAS, the Department of the Interior as mandated, has formally requested public review of comment on the Draft Environmental Impact Statement on Lease Sale 53, and a Public Hearing on Lease Sale 53 will be held by the Bureau of Land Management in Santa Cruz on June 25, 1980 and a written testimony is to be accepted until July 3, 1980; and

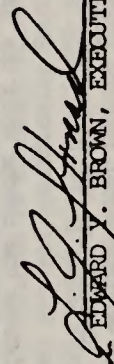
WHEREAS, the Department of Interior is mandated to consider and respond to all comments on the Draft Environmental Impact Statement.

NOW, THEREFORE, BE IT RESOLVED that the Central Coast Regional Commission finds the Draft Environmental Impact Statement in need of substantial clarification, correction and additional evaluation of yet-to-be-completed data in order to determine consistency with Chapter 3 of the Coastal Act as the proposed action would threaten the coastal resources and character of the Central California coast and therefore recommends the Santa Cruz Basin Tracts be deleted, and the leasing of the Northern Santa Maria Basin Tracts be delayed, consistent with Santa Barbara and San Luis Obispo County Board of Supervisors Resolutions for a minimum of two years, or until such time that adequate baseline environmental studies are completed; and

BE IT FURTHER RESOLVED, that this resolution be transmitted to Cecil Andrus, the Secretary of the U.S. Department of the Interior.

DATED: June 9, 1980

ATTEST:


EDWARD X. BROWN, EXECUTIVE DIRECTOR

AFFIRMATIVE VOTE ON APPLICATION:

AYES: 15 Bedesen, Blohm, Forbus, Garcia, Gregorio, Hughes, Hummel, Leavy, Levy, McCarthy, Osmer, Taylor, Walters, Wyman, Henderson

NAYES: 0

ABSTENTIONS: 1 Nix

ABSENT: 0

Mary W. Henderson
MARY W. HENDERSON, CHAIRMAN

RESOLUTION NO. III-80-15

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

30 VAN NESS AVENUE
SAN FRANCISCO, CALIFORNIA 94102
PHONE: 557-3686



June 23, 1980

Pacific Outer Continental Shelf Office
Bureau of Land Management
1340 West Sixth Street, Room 200
Los Angeles, California 90017

ATTENTION: John Lane

SUBJECT: Draft Environmental Impact Statement: Proposed 1981 Outer
Continental Shelf Oil and Gas Lease Offshore Central and
Northern California, OCS Sale No. 53

Dear Mr Lane:

We appreciate very much the opportunity to comment on the Draft Environmental Impact Statement (DEIS) for the proposed 1981 lease sale off the coast of central and northern California, Lease Sale #53. The Commission has reviewed the DEIS in light of the provisions of the McAttee-Petris Act, its law, the San Francisco Bay Plan, and the Commission's coastal zone management program for the San Francisco Bay segment of California's coastal zone. On June 19, 1980, the Commission directed me on its behalf to transmit to you the following comments regarding the DEIS.

BCDC Jurisdiction and Areas of Authority

The San Francisco Bay Conservation and Development Commission (BCDC), a state agency, has planning and permit authority over San Francisco Bay, its associated tidal marshes, managed wetlands, and saltponds, and a 100-foot shoreline band inland from the line of highest tidal action. The western boundary of the Commission's jurisdiction is a line drawn from Point Bonita to Point Lobos at the Golden Gate. The Commission is empowered at the state level by the McAttee-Petris Act as a planning and regulatory agency, and carries out the policies of its San Francisco Bay Plan, an enforceable planning document, and the provisions of the McAttee-Petris Act. The McAttee-Petris Act limits the type and amount of fill which may be placed in the Bay. The Bay Plan assigns priority uses to certain areas of the Bay and shoreline and sets forth policies and standards for the development of the Bay and shoreline for a variety of uses.

The McAttee-Petris Act and the Bay Plan are included within BCDC's coastal zone management program, "Management Program for San Francisco Bay," which was approved in November, 1977 by the Secretary of Commerce. Thus, any federal activity that directly affects San Francisco Bay must be consistent to the maximum extent practicable with the BCDC Management Program.

Mr. John Lane
June 23, 1980
Page 2

Although the lease sale tracts are well outside the Commission's jurisdiction, exploration and extraction activities associated with the sale would have impacts on BCDC's segment of the coastal zone. Scenarios 1, 1A and 2 in the DEIS assume transport of all oil from the Point Arena, Bodega and Santa Cruz areas via tankers, barges, and/or pipelines to the San Francisco Bay area for refining. The DEIS also assumes that a major onshore support facility will be located in the San Francisco Bay area. It would appear that many associated activities would require a BCDC permit. For example, construction or expansion of pipelines, terminals, or piers in the Bay or on the shoreline to serve Bay Area refineries would require permit approval. Permits might also be required for onshore support facilities such as operation facilities, repair and maintenance yards, processing plants, and fabrication yards.

Increased tanker, barge and supply boat traffic in the Bay would increase the possibility of vessel collisions and terminal accidents resulting in oil spills leading to damage to the Bay environment. BCDC is actively involved in studying and planning port use and expansion around the Bay in conjunction with the Metropolitan Transportation Commission. The current port study includes consideration of vessel traffic in the Bay and its influence on Port activities. Increased tanker traffic could have an effect on the Commission's port planning.

Even though Lease Sale #53 will result in impacts on San Francisco Bay, the DEIS omits discussion and analysis of those impacts necessary for the Commission to consider in making any consistency determination. Those omissions can be classified into three groups: (1) transportation of oil and gas, (2) oil spills; and (3) refinery capacity, as discussed below.

Transportation of Oil and Gas

The DEIS Transportation scenarios describe two basic methods of transporting OCS products onshore. Gas would be piped onshore and oil would be primarily transported by vessels: tankers or barges. These two methods of transportation have different impacts and risks for San Francisco Bay and its shoreline, and fall under different types of review by the Commission.

1. Vessel Traffic. The DEIS does not include -- and we think it should -- an analysis of current vessel traffic in San Francisco Bay and the impact that increased project-related vessel traffic, e.g. tankers, barges and supply boats, would have on (a) overall traffic, (b) possible vessel collision, or (c) oil transfer accidents at lightering stations in the Bay or at refinery terminals. The DEIS assumes that the OCS related vessels would "back out" other foreign and domestic tankers, and there would be no change in patterns and frequency of petroleum-related vessel traffic and petroleum off-loading practices and frequency. However, there is no information in the DEIS to support this assumption, nor any information regarding the size and number of tankers to be "backed out." Under the scenarios, a large number of trips by small tankers and barges would be replacing the current number of trips made by very large foreign and domestic tankers. This in itself would have an impact on traffic and possible accidents. Further analysis regarding vessel traffic impacts should be carried out as part of the DEIS.

In addition, there is no information in the DEIS supporting the type or size of vessels described in the scenarios, (25,000 DWT tankers, 15,000 barrel and 100,000 barrel barges). This information we feel, should be included in the DEIS. We understand that existing OCS operations in southern California use small tankers almost exclusively. After discussions with the Coast Guard, we believe that the use of tankers with trained licensed personnel would ultimately lessen the risks of accidents and spills. We also understand that for towed barge transport, only the tug operator is licensed. With towed barges, there is the possibility that the tow line could break, as recently occurred off the Marin County shoreline, and weather conditions could more readily interrupt the transportation process. Therefore, we feel the assumptions regarding barges versus tankers should be fully explained in the DEIS.

Further, additional information should be added to the DEIS analyzing the impact of transport exclusively by tankers. Substituting a 30,000 DWT tanker for the 15,000 barrel barge proposed for the Bodega area would reduce vessel trips per year from 130 to about 20 trips per year. Substituting a 30,000 DWT tanker for the 100,000 barrel barge proposed for the Santa Cruz area would reduce annual vessel trips from 120 to 60. This would substantially lessen impacts.

2. Vessel Lanes. The Coast Guard is currently studying port access routes, as required by the Port and Waterways Safety Act of 1972. The Eleventh and Twelfth Coast Guard Districts are conducting studies of areas that lie within the tracts proposed for leasing in Lease Sale #53. The completion date for the data collection is June 1, 1980, with the study results and routing proposals to be completed by January 1, 1981. The final navigation safety plan will probably not be completed prior to the May 1981 lease sale date. Inclusion of a southerly accessway to San Francisco Bay would conflict with the development of lands in the Santa Cruz study area. Delay of the lease sale would allow the Coast Guard to complete their studies prior to the leasing of any tracts. If the lease sale is not delayed, all tracts within the Coast Guard-delineated navigation routes should be deleted, as soon as the Coast Guard study is complete. No development of tracts within possible traffic lanes should be allowed.

3. Pipelines. According to the DEIS, pipelines would be constructed to transport gas from the Point Arena and Santa Cruz areas. It is assumed that no gas will be brought onshore from Bodega. In Transportation Scenarios 1 and 1A, oil would also be piped onshore. An additional transportation scenario should be added to the DEIS which provides for pipeline transportation of both oil and gas. Transport via pipeline would limit the adverse impacts of air emissions, oil spills, vessel traffic, and vessel and terminal accidents.

Additional information should be included in the DEIS about the existing onshore pipeline in the Santa Cruz area. The information should include the location of the pipeline, its current use and capacity, and description of any modifications necessary for the pipeline to handle the OCS oil.

Oil Spills

The increased vessel traffic (if OCS assumptions are correct, a greater number of small vessels would replace fewer large tankers) in the Bay would increase the chances of vessel collisions and accident-related oil spills. Oil spills often occur in connection with the loading and unloading of oil at refinery terminals. Many of these loading and off-loading accidents are due to human error. BCDC is concerned with the impact of increased spills in the Bay, as well as the possibility of oil coming into the Bay system from offshore spills. The DEIS should discuss mitigation measures to counteract increased risk of spills. Mitigation or conditions could include containment facilities, training programs, boom locations, funds for clean-up equipment, etc.

The DEIS includes analysis of oil spills from offshore activities and transportation. However, the background report prepared by U. S. Geological Survey, "An Oilspill Risk Analysis for the Central and Northern California (Proposed Sale #53) Outer Continental Shelf Lease Area," 1980, includes no information regarding either the size of the tankers transporting the oil, nor the number of tanker trips per year from each of the study areas. The "most likely number of spills" greater than 1000 barrels during the 25-year life of the project, is two, if tankering oil from Point Arena and Bodega, and three, if tankering oil from Point Arena, Bodega and Santa Cruz tracts. There is no information in the background study regarding the probability of spills within the Bay itself. We feel that additional modeling and analysis should be carried out regarding possible impacts on the Bay environment with a variety of transportation scenarios, including Transportation Scenarios 1, 1A and 2 and new scenarios using all small tankers (30,00 DWT) and all pipelines.

Refinery Capacity

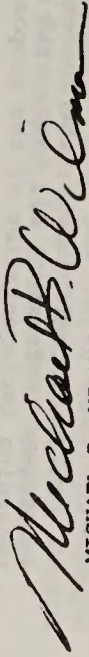
Scenarios 1 and 1A assume that the oil from the Point Arena, Bodega and Santa Cruz areas would be refined at existing refineries in the San Francisco Bay area. The DEIS assumes that current oil imports would be refined in other areas of the United States.

The DEIS assumes a 1.6 percent annual increase in refinery capacity, but does not include an analysis of the impacts of the increased air emissions on the Bay Area air basin brought about by this increase and the change in type of oil refined. The DEIS should also discuss mitigation for any increases in air pollution because of the increase and different type of oil refined. Mitigation for this increased pollution should be addressed in the DEIS.

Mr. John Lane
June 23, 1980
Page 5

We urge that the DEIS be supplemented with the additional information and analysis we have outlined above regarding the impacts of Lease Sale #53 on the San Francisco Bay segment of the coastal zone to allow the Commission to be able to fully assess the impacts of OCS development, and address mitigation and conditions for such development.

Very truly yours,



MICHAEL B. WILMAR
Executive Director

MBW/lg

cc: Michael Fischer, Executive Director, California Coastal Commission
Richard Charter

City of Carmel-by-the-Sea

POST OFFICE BOX CC
CARMEL, CALIFORNIA 93921
(408) 624-2781

June 17, 1980

Bureau of Land Management
Mr. William Grant
Pacific OCS Office
300 N. Los Angeles Street, Room 7127
Los Angeles, California 90012

Dear Sirs:

The City of Carmel-by-the-Sea City Council unanimously requested that this letter be sent objecting to the procedures used in the handling of Lease Sale 53.

The City has long exerted every effort to protect the City's renowned sandy beach and the clear waters of the bay which it faces.

The City is distressed about the lack of thoroughness of the environmental studies which have been conducted in connection with this leasing process. The City is particularly concerned about the extremely severe biological aesthetic and economic impacts which could result from oil spills.

The Council would join with its fellow Association of Monterey Bay Area Governments to request deletion of the Santa Cruz Basin and at least a two year delay for further study of the Santa Maria Basin.

This letter reaffirms the basic sentiments expressed previously in City Resolutions 80-14 and 80-15 (copies attached).

The Council would strongly urge an extremely conservative approach to such off-shore activity with its irreversible impacts.

Sincerely,

Douglas D. Peterson

Douglas D. Peterson
City Administrator

DDP:pjd

Enclosures as indicated above

CITY OF CARMEL BY-THE-SEA

RESOLUTION NO. 80-14

RESOLUTION TO SUPPORT ALTERNATIVE 5 IN THE PROPOSED FIVE-YEAR OCS LEASE SCHEDULE

WHEREAS, The United States Department of the Interior is charged with administering the mineral development of the Outer Continental Shelf under the OCS Lands Act of August 7, 1953 (67 Stat. 452; 43USC: Sections 1331-1343); and

WHEREAS, the OCS Lands Act Amendments passed by Congress on September 18, 1978 (92 Stat. 649; 43USC: Sections 1344-1348), set forth the criteria to be considered by the Department of Interior in developing a five-year leasing schedule for OCS Lease activity; and

WHEREAS, the Department of the Interior has prepared the Final Environmental Statement for the Proposed Five-Year OCS Oil and Gas Lease Sale Schedule--March, 1980-February, 1985; and

WHEREAS, in response to the State of California and other commentators on the Draft Environmental Statement for the Proposed Five-Year OCS Oil and Gas Lease Sale Schedule, an Alternative 5 has been included in the Final Environmental Statement which would:

- o Delay the proposed Central and Northern California Sale (#53) from 1981 to 1983 to allow time for completion of necessary environmental studies;
- o Omit the 1983 California Sale included in Alternative 1 (#73);
- o Designate in 1984 California Sale (#80) as a Southern California Sale; and

WHEREAS, comments on the Final Environmental Statement are accepted until February 25, 1980; and

WHEREAS, Cecil Andrus, the Secretary of the Department of Interior, subsequent to February 25, 1980, will make recommendations to Congress regarding implementation of the proposed Five-Year Lease Sale Schedule;

NOW, THEREFORE, BE IT RESOLVED, that the CITY OF CARMEL-BY-THE-SEA hereby adopts this resolution supporting inclusion of Alternative 5 in the Five-Year OCS Oil and Gas Lease Sale Schedule; and requesting Secretary Andrus to adopt Alternative 5 in his recommendation to Congress; and calling for the completion of necessary environmental studies not planned by the Bureau of Land Management (such as current

CITY OF CARMEL-BY-THE-SEA

RESOLUTION NO. 80-15

RESOLUTION REGARDING OUTER CONTINENTAL SHELF LEASE SALE #53

and oil spill movement) prior to any leasing decisions concerning Central and Northern California; and

FURTHER RESOLVED, that this resolution be transmitted to Cecil Andrus, the Secretary of the United States Department of the Interior.

PASSED AND ADOPTED by the City Council of the City of Carmel-by-the-Sea this 3rd day of March 1980, by the following roll call vote:

AYES:

COUNCIL MEMBERS: Arnold, Brown, Brunn, Gross, Norberg

NOES:

COUNCIL MEMBERS: None

ABSENT:

COUNCIL MEMBERS: None

WHEREAS, the OCS Lands Act Amendments require a balance of environmental risks, development benefits and adverse impacts in selecting the timing and location of Outer Continental Shelf development; and

WHEREAS, necessary environmental studies on the lease sale are either not being conducted or will not be completed prior to the scheduled lease sale; and

WHEREAS, the Preliminary Draft Environmental Statement prepared by the Bureau of Land Management does not adequately qualify and address the potential environmental and socio-economic impacts of the proposed lease sale or energy alternatives; and

WHEREAS, the value of existing coastal resources are vitally important to the environment and economy of Central California; and

WHEREAS, projected accidental oil spills resulting from the proposed lease sale can not be mitigated under other than mild sea and weather conditions, and;

WHEREAS, the resource potential offshore the Central California coast is minimal and of low quality;

NOW, THEREFORE, BE IT RESOLVED, that the CITY OF CARMEL-BY-THE-SEA requests that the Department of the Interior complete and include all necessary environmental and socio-economic studies prior to considering leasing of area #53 currently scheduled for May, 1981, and to investigate establishment of a petroleum reserve to be used only in time of national emergency.

PASSED AND ADOPTED by the City Council of the City of Carmel-by-the-Sea this 3rd day of March 1980, by the following roll call vote:

AYES:

NOES:

ABSENT:

COUNCIL MEMBERS: Arnold, Brown, Brunn, Gross, Norberg
COUNCIL MEMBERS: None
COUNCIL MEMBERS: None

Signed:

Attest:

City Clerk thereof

Signed:

Gunnar Norberg, Mayor
City of Carmel-by-the-Sea

Attest:

Patricia Joyce Dantes
City Clerk thereof

Mayor of said City

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D. C. 20426

Manager, Pacific OCS Office
Bureau of Land Management
1340 W. 6th St., Room 200
Los Angeles, California 90017

JUN 30 1980

Dear Sir:

We appreciate the opportunity to comment on the draft environmental impact statement (DEIS) evaluating the proposed Central and Northern California Outer Continental Shelf (OCS) Oil and Gas Lease Sale No. 53. The Federal Energy Regulatory Commission's (FERC) Office of Pipeline and Producer Regulation offers the following comments.

- (1) The discussion on pages 3-85 and 3-86 of the DEIS concerning the liquefied natural gas (LNG) facility at Point Conception, California, contains several errors and should include some additional information. We suggest the following as a substitute:

On September 26, 1979, the Federal Energy Regulatory Commission (FERC), within the Department of Energy (DOE), conditionally approved construction of a liquefied natural gas (LNG) import facility at Point Conception, in Santa Barbara County, California. The terminal would receive, store, and regasify liquefied natural gas derived from gas produced in Indonesia and from Cook Inlet in Alaska.

The facility would be built by Western LNG Terminal Associates, a partnership comprised of Western Terminal (a subsidiary of Pacific Lighting Corporation) and Pacific Gas Terminal Company (a subsidiary of Pacific Gas and Electric Company). The onshore facility complex would be located on a 209-acre site; the marine terminal would occupy 30 to 35 acres of leased subtidal land extending approximately 4,600 feet

offshore. The facility would operate two 550,000-barrel LNG storage tanks and eventually vaporize LNG at an average plant output of 0.9 billion cubic feet per day (Bcfd), with additional peaking capacity of 0.3 Bcfd. Approximately 129 LNG deliveries would occur at the terminal each year; however, the exact number of arrivals would depend on the final selection of ship size. Revaporized gas would be transported through a 111-mile long pipeline to be constructed from Point Conception to Gosford, near Bakersfield, California, where the pipeline would join existing gas transmission facilities owned and operated by Pacific Gas and Electric Company. At this time, all necessary permits, licenses, and certificates that would be required for final approval of the proposed project have not been issued.

- (2) In the "Pipeline System" section on page 3-112, the second sentence in the first paragraph should be replaced with the following sentence:

PG&E has relied on three sources of natural gas supply for distribution in California markets: (1) gas from the southwest delivered at the Arizona-California border by El Paso Natural Gas Company (El Paso), (2) gas from Alberta, Canada, delivered by Pacific Gas Transmission Company (PGT), and (3) gas from producing fields within California.

- (3) The following additional information should be provided in the discussion of "Oil and Gas Infrastructure" beginning on page 3-113.

Since 1973, the El Paso system has been curtailed, and the quantities of natural gas which PG&E has received from El Paso have been substantially reduced. In 1978, El Paso supplied 35 percent of PG&E's total natural gas purchases, while about 48 percent of its natural gas supply came from Canada. More than 60 percent of the Canadian export volume is subject to expiration

by the end of 1986. PG&E received approximately 17 percent of its natural gas supply from California producers in 1978. However, net additions to reserves of gas in California have not kept pace with the decline in supply from existing California fields. Overall, PG&E has found it necessary to impose increasing curtailments on industrial customers. PG&E projects that its high priority customers face curtailment by the 1983-84 winter heating season if supplies from traditional areas are not substantially augmented.

The Commission is directing its efforts toward regulatory actions to improve domestic natural gas supplies. More specifically, the Commission is presently analyzing proposals for additional transportation of natural gas into California. The Commission staff recognizes the national importance of OCS exploration and development, as well as the need for effective environmental safeguards. Based upon a review of your DEIS, we believe that the proposed OCS oil and gas lease sale is in the national interest.

Very truly yours,

Kenneth A. Williams

Kenneth A. Williams, Director
Office of Pipeline and Producer
Regulation



STATE OF
WASHINGTON
Dwight Lee Ray
Governor

DEPARTMENT OF ECOLOGY
Mail Stop PV/11
Olympia, Washington 98504
206/753 2000

John Lane
U.S. Dept of the Interior
July 1, 1980
Page two

July 1, 1980

John Lane
U.S. Department of the Interior
Bureau of Land Management
Pacific OCS Office
1340 W. Sixth St., Room 200
Los Angeles, CA 90017

Dear Mr. Lane:

Draft EIS - OCS Sale #53

We submit the following comments in response to our review of the above noted draft EIS:

1. Impacts on Land Use (IV.B.9, pages 4-184-4-187):

We agree that the proper implementation of local coastal zone plans and port master plans can effectively mitigate or reduce environmental impacts associated with onshore facilities. We note, however, that the local coastal plans for the affected area have yet to be certified.

While the coastal plans are being developed, it may be helpful to be more specific with respect to potential impacts associated with onshore facilities, including oil and gas pipelines. Further environmental review should be required prior to construction of major onshore facilities.

Pipeline construction and operation activities may lead to a number of adverse environmental impacts. Construction impacts are likely to be greatest when a pipeline is laid through sensitive environments such as wetlands and water courses. Consequently, the most important decision affecting pipeline construction impacts is selection of the route. Other concerns include the serious problems resulting from accidental spills and fires and explosions. Oil spills from pipelines can cause substantial damage if they are not detected quickly. Fires and explosions at pipeline pumping stations can also cause considerable damage to terrestrial resources.

OCS service base construction can also cause adverse impacts. Dredging and bulkheading operations during construction of navigational channels, dry docks, or ship berths may cause a wide range of impacts from the alteration of littoral drift and circulation patterns to the destruction of habitat and disturbance of wildlife. Site clearing and road construction can also entail significant environmental effects. Changes in surface runoff may lead to sedimentation and smothering of aquatic organisms. Many of the same impacts can result from construction of new or expanded OCS platform fabrication and assembly yards.

Storage tanks involve a number of construction and operation activities which could result in adverse impacts. Clearing and grading of the site and paving of roads and parking areas may lead to increased sedimentation and altered surface water runoff. Spills and explosions are also a hazard, although a properly designed facility with 100 percent diking capacity around each tank will substantially reduce the risk of environmental damage. In addition, oil sludge must be disposed of carefully to avoid contamination of sediments and aquifers.

2. Number of Offshore Structures (IVA.2.b, pages 4-22-4-24):

The draft EIS indicates that an estimated 19 platforms, four offshore storage and loading facilities with SMB, six subsea production systems, and 55 subsea completion systems will be needed for the sale area. The draft EIS does not indicate how many of these structures are already in existence, nor whether new fabrication and assembly yards would be required to furnish structures to the frontier area. Since construction of such structures may take place outside of the northern and central California region, it would prove beneficial to know what the demand for any new structures will be, and correspondingly, the need for expansion of existing (or development of new) fabrication yards.

Thank you for the opportunity to review the draft statement. We hope you find our comments helpful.

Sincerely,

Joseph R. Williams
Environmental Planner
Shorelands Planning Section

JRW:s

OFFICE OF HISTORIC PRESERVATION

DEPARTMENT OF PARKS AND RECREATION

POST OFFICE BOX 2390

SACRAMENTO, CALIFORNIA 95811

(916) 445-8006



JUL 3 1980

John Lane
US Bureau of Land Management
Pacific Outer Continental Shelf Office
1340 West Sixth Street, Room 200
Los Angeles CA 90017

RE: DEIS for Proposed 1981 Outer Continental Shelf Oil and Gas Lease
Sale 53, Offshore Central and Northern California

Dear Mr. Lane:

The Office of Historic Preservation has reviewed the Draft Environmental Impact Statement prepared for the undertaking referenced above.

Based on the information presented, I find that the proposed undertaking is not in compliance with Section 106 of the National Historic Preservation Act of 1966. While the document states that there will be effects caused by anchoring, drilling, and placement of pipelines, no specific recommendations or stipulations for the identification, assessment and protection of cultural properties have been formulated.

I therefore recommend that management of the resources be dealt with by first conducting an overview study for the area to be affected by the OCS Sale No. 53 activities. Archeologists conducting the cultural resource assessments for each lease area could then connect their information to a research framework; obviating in many cases, duplications of effort.

This study should be based on:

1. BLM's in-house study (1979) concerning available shipwreck data. This information will assist in determining the approximate distance from shore where most shipwrecks have been previously identified and may probably be expected to occur.
2. Previous underwater surveys, which identified prehistoric remains along the California OCS, and information concerning previous sea levels. Compilation of this data should lead to a determination of the area most likely to contain prehistoric remains within each of the lease areas.
3. Knowledge of the location of ethnic socio-cultural properties (i.e., gathering sacred, or known historic and prehistoric site areas). This will involve meeting with interested individuals and groups who may have knowledge of cultural resource locations or concerns about the effects of gas and oil drilling and pipeline construction (both on and off-shore). Determinations of National Register eligibility and project effects could be expedited by the identification of such knowledgeable individuals and groups.

John Lane
Page 2

4. An evaluation of the techniques utilized for previous on and off-shore cultural resource identification programs. The specific techniques recommended for the recordation of sites within the OCS lease area can then be devised.
5. An evaluation of the various types of cultural properties which have been or may be identified along the OCS area. This should include a general evaluation of their significance compared to other coastal sites.
6. The formulation of specific recommendations for the protection of the cultural resources. This might include:
 - a. The specific distance explosives may be utilized from cultural resources, without causing damage.
 - b. The closest area the ship can be anchored from a cultural resource to assure no impacts will occur. The actual area of potential impacts caused by anchoring activities (the anchor, chain and cable) must be determined prior to allowing any testing.
 - c. Specific procedures formulated to inform workmen and supervisors of the presence, type and significance of cultural resources. This will aid in their recognition of resources which may be uncovered during construction and the procedures to be followed after this discovery.

Prior to allowing the testing to occur in the lease areas, an archeologist should conduct the identification, assessment and formulation of impact mitigation measures for all cultural resources located within the area of potential environmental impact. The techniques utilized, the extent of the survey and the determinations of significance will be based on the overall OCS cultural resource study.

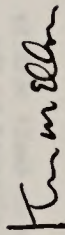
Archeological monitoring, during and after the drilling operations are completed, will determine the effectiveness of the impact mitigation measures.

All debris on and off-shore should be removed, if possible, after construction activities are complete. The remaining pilings and well casings, which cannot be removed, should be plotted on cultural resource maps. This will clarify the anomalous readings picked up by future remote sensing surveys.

John Lane
Page 3

For further assistance in this matter, please feel free to contact Jeffery Bingham at (916) 322-8701.

Sincerely yours,



Dr. Knox Mellon
State Historic Preservation Officer
Office of Historic Preservation

KH:CC:pp

cc: Charles Nigrette
Advisory Council on Historic Preservation
Lake Plaza South, Suite 616
44 Union Blvd.
Lakewood CO 80228

State Clearinghouse
Governor's Office of Planning and Research
1400 10th Street
Sacramento CA 95814

Marie Gottdierner
California Coastal Commission
631 Howard Street
4th Floor
San Francisco CA 94105

Ted Fukushima
State Lands Commission
1807 13th Street
Sacramento CA 95814

Marin County Comprehensive Planning Department

CIVIC CENTER SAN RAFAEL, CALIFORNIA 94903 TELEPHONE 479-1100 MARJORIE W. MACRIS AICP DIRECTOR

July 2, 1980

TO: Bureau of Land Management, POCs Office

FROM: Warner Chabot

RE: Comments on the Draft Environmental Impact Statement

My comments today are based on my dual experiences as a Coastal Energy Impact Program planner for Marin County and as a public member of the DOI's Western States Regional Technician Working Group.

My full comments will be rather detailed and specific, but for the purposes of this hearing today, I will address the most general comments about the D.E.S. and those specific issues of greatest importance to Marin County, ... namely oil spills.

General Comments:

1. The first point is more political than technical. It is important that this panel be fully aware of the extreme cynicism with which most local reviewers perceive the review and comment process. This cynicism is based on the following reasons:

- Over 400 pages of specific detailed comments were provided by local reviewers of the preliminary D.E.S. Few, if any, of these comments were influential in changing the D.E.S. In fact, the POCs schedule provided approximately one week to incorporate local comments into the D.E.S.
- The document appears to be influenced more by DOI attorneys who wish to prevent litigation than by scientists who are attempting to assess impacts.
For example, Section 1 entitled "Purpose and Need" runs an unnecessarily long 82 pages in apparent contradiction to CEQ guidelines, specifically Section 1502.13 which suggests that this section be brief. 82 pages is not brief. The discussion of OCS operating orders and other mitigations before the project is described seems unnecessarily defensive and out of place. In discussing this with members of the President's Council on Environmental Quality, I have found agreement on this point.
- Yet another basis for local cynicism is the arbitrary manner in which issues of great local concern are given little or no weight in the D.E.S. There are two examples of this point:

1) The DES fails to acknowledge the option of deleting one or more basins from the sale by the conclusion that, "conflicts were not pervasive enough to warrant exclusion".

2) While almost every affected local government suggested the possibilities of separating oil exploration from production, the DES spent less time on this subject than it did on discussing Indian arrowhead making techniques.

2. Other general comments I wish to make regarding the DES include the following:

- A lack of footnoting and scientific notations to identify the factual source for many conclusory statements. The FES on the Point Reyes-Farrallon Island Marine Sanctuary provides a good example of such footnoting and citations.
- The lack of a basin by basin analysis greatly hampers local evaluation of impacts and seems to ignore the Section 18 requirements of the OCS Lands Act which calls for "balancing" of respective areas, resource potentials and risks to the environment.
- I must echo the often heard criticism of the short time frame and the uncompleted critical environmental studies.
- The lack of any acknowledgement that potential future lease sales could increase the predicted impacts many fold during the 25 year period under discussion.

Oil Spill Analysis

Concerns over the Quality of the D.E.S. are reflected by the treatment of the oil spill issue. This is the most significant potential impact on the Northern California coast, yet mitigation measures are not discussed in the D.E.S. (for example, what coastal estuaries should have onsite boom systems). I do not believe that the brief discussion of the oil spill contingency fund fulfills the need to discuss mitigations. Please also keep in mind that local oil spill planning identified in the U.S. Coast Guard's document, "U.S. Local Area Oil and Hazardous Substances Pollution Contingency Plan", is only in rudimentary form.

However, the DES offers no site specific analysis of the possible impacts of an oil spill along a majority of the Northern California Coast. This information gap is due to highly optimistic oil spill estimates which predict less than a 5% possibility of oil spills reaching the coast. I must seriously challenge that assumption for the following reasons:

- The spill estimates for the Marin Coast are based on 8 million barrels production from Bodega basin. But Oil Industry spokesmen indicate that 45-50 million barrels are needed to economically justify production. Therefore, oil spill frequency should be increased approximately 6 fold in proportion to the oil resource estimates necessary for production.

2. Oil spill predictions do not account for cumulative impacts. The DES does not acknowledge that the current 8 tracts in the Bodega Basin are 15% of possible tracts which would be leased. Cumulative impacts from future sales (#73 and #80) could increase overall impacts 6 or 7 fold again.
3. The oil spill model offers little data to justify its conclusions. The Computer's ocean current data comes from the Cal-Coffee Geostrophic flow which was taken in areas of greater than 600 feet in depth. The entire 8 Bodega tracts and most of the Santa Cruz and Pt. Arena tracts are in depths less than 600 feet. These nearshore currents are subject to much greater variation due to upwelling and near-shore eddies and geography. Wind data has been estimated from stations 100-150 miles away.

The purpose of these comments is not to nitpick predictions which are agreeably difficult to make, but rather to point out that the impacts to our coast could be far greater than is acknowledged in the DES...and that the F.E.S. should reflect these possible cumulative effects.

One final point on the subject of safety. At almost every recent hearing, representatives from the oil industry point to exploratory drilling of 20 wells in the mid-1960's as proof of the safety of 25 years of future oil production. This is a false argument. The same industry spokesmen are fond of quoting a NAT Academy of Science report on sources of global ocean pollution which estimates 1-3% of oil pollution originating from drilling and platform activity while 30-35% comes from oil transport. It is simply illogical and stretching the facts to suggest that 3 years of exploratory drilling somehow proves the safety of 25 years of production.

Conclusion

The F.E.S. should include an alternative which deletes 3 central basins from this lease sale.

The F.E.S. should revise its estimates regarding oil spills to account for realistic production scenarios of 40-50 million barrels as well as the possible cumulative impacts of two future sales.



CITY OF PISMO BEACH
CALIFORNIA

CITY HALL
1000 BELLO STREET

July 3, 1980

Pacific O C S Office
Bureau of Land Management
1340 W 6th St., Rm. 200
Los Angeles, CA 90017

Re: Pismo Beach Resolution opposing Outer Continental
Shelf Lease Sale #53

Dear Sirs;

The City of Pismo Beach opposes the development of Outer Continental Shelf Lease Sale #53. The City Council's Resolution attached provides background information and reasons for this opposition.

We are concerned that the Bureau of Land Management, throughout the preparation of the preliminary draft and the Draft Environmental Impact Statement on Lease Sale #53, has not been listening to our concerns with regards to Lease Sale #53. The County of San Luis Obispo as a whole has recommended several alternatives to the proposed Federal Action, such as a delay in the 5 year leasing program of Lease Sale #53 for at least 2 years to complete crucial environmental studies, and placing the Santa Maria Basin into a National Petroleum Reserve.

It is imperative that one of these options be adopted if the National Interest dictates that our recommended option (no project) cannot be adopted.

Please listen to Pismo Beach and the County of San Luis Obispo. Our concerns are legitimate! Our concerns are real!

Sincerely,

Wayne H. Hoereth
City Administrator

cc: Pacific OCS Office
Bureau Land Management
California Coastal Commission
South Central Coastal Commission
Office of Planning and Research
State Lands Commission
Senator Alan Cranston
Congressman Leon Panetta
San Luis Obispo County

enc: 2

WHH:kd

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF PISMO BEACH REGARDING THE DEPARTMENT OF INTERIOR OUTER CONTINENTAL SHELF LEASE SALE #53 AND ITS DRAFT ENVIRONMENTAL IMPACT STATEMENT.

The City Council of the City of Pismo Beach does resolve as follows:

WHEREAS, the City of Pismo Beach has been an active participant in the County of San Luis Obispo Outer Continental Shelf (OCS) Task Force; and

WHEREAS, the City of Pismo Beach has reviewed and studied the Draft Environmental Impact Statement for OCS Lease Sale #53; and

WHEREAS, the City of Pismo Beach sees the OCS Lease Sale #53 as being a very short-term solution to the nation's energy problems which does not merit the potential long-term unavoidable adverse impacts or commitment of renewable and non-renewable resources; and

WHEREAS, the City of Pismo Beach is very concerned with the potential physical and social adverse impacts resulting from nearness of the proposed off shore oil drilling to the City's coastline, particularly those impacts relating to visibility of the drilling platforms from our tourist areas; increase of pollutants to our air which may violate our Air Quality and Maintenance Plan; and the potential for oil spills and resultant impacts to our scenic and environmentally sensitive coastline, particularly the impacts to the Pismo Clam and abalone beds, kelp fields, and tide pools; and

WHEREAS, the City's economy is principally tourism, with very limited facilities to provide for any growth as a result of OCS development; and

WHEREAS, the State of California Department of Parks and Recreation has proposed a portion of the coastline off the City of Pismo Beach as a State Underwater Park and Preserve which would not be compatible with drilling platforms and possible oil spills; and

WHEREAS, no specific studies have been conducted to determine exactly the effects of OCS development on the City of Pismo Beach's economy; and

WHEREAS, the DEIS does not adequately address specific beneficial or adverse impacts to the City of Pismo Beach or San Luis Obispo County; and

WHEREAS, the City of Pismo Beach has reviewed the possible alternatives to the proposed federal action and has determined that there are alternatives more favorable to the proposed OCS Lease Sale #53.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Pismo Beach, as follows:

1. The City of Pismo Beach recommends adoption of Alternative 5 in the DEIS which is the cancellation of Lease Sale #53.
2. If Alternative #5 is not to be considered by the Department of Interior as the most viable alternative, then the City, as its second position, recommends adoption of Alternative #4, "Delay the sale," and an Alternative #6, placement of the Santa Maria basin into a National Petroleum Reserve.
3. The City concurs with the San Luis Obispo County Position Statement on Proposed OCS Lease Sale #53 and its Draft Environmental Impact Statement which is attached with the exception of City's recommendation for adoption of Alternative #5 in the DEIS as its primary position.
4. The City supports the deletion of specific tracts on the basis of interest, unacceptable risks or potential pervasive conflicts with coastal and marine resources.
 - a. Hosgri Fault Zone
 - b. Active Subsea Slump and Landsliding Areas
 - c. Major Vessel Traffic Routes
 - d. High-yield/High Priority Commercial Fishing Grounds
 - e. Establish a 6 mile Buffer from shore between Oceano and Point Conception
 - f. Establish a 9 mile Buffer from two proposed underwater parks extending from Morro Bay south to Shell Beach
 - g. Delete those remaining tracts that are physically isolated from the major leasing areas and are in close proximity to sensitive areas.
5. If any leasing is to occur, the City requests that prior to leasing, mandatory redefined geologic, biological and cultural lease sale stipulations be required to assure specific tract-by-tract studies for the identification and mitigation of geologic risks, and assure protection of important cultural and biological resources.

6. If any leasing is to occur, the City requests that a lease stipulation be imposed requiring a centralized oil spill cleanup case in San Luis Obispo County.

7. If any leasing is to occur, the City requests that a lease sale stipulation be imposed requiring every emission source to have an air quality impact analysis including cumulative impacts.

In addition, the sale should be cancelled if the proposed air quality regulations cannot assure future compliance with federal and state clean air standards.

On motion of Councilperson Richardson, seconded by Councilperson Carter, and on the following roll call vote, to wit:

AYES: Richardson, Carter, Dillon, Mellow, Eldwayen

NOES: None

ABSENT: None

the foregoing Resolution is passed and adopted this 25th day of June, 1980.

ATTEST:

APPROVED AS TO FORM:

Marion L. Houston, City Clerk
Marion L. Houston, City Clerk
City of Pismo Beach

Webb Eldwayen
Webb Eldwayen, Mayor
City of Pismo Beach

A.J. Shaw, Jr.
A.J. Shaw, Jr.
City Attorney
City of Pismo Beach

STATE OF CALIFORNIA

EDMUND G. BROWN JR., Governor

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

30 VAN NESS AVENUE
SAN FRANCISCO, CALIFORNIA 94102
PHONE: 557-3686



July 2, 1980

William E. Grant
Pacific OCS Office
1340 W. Sixth Street, Room 200
Los Angeles, California 90017

Dear Mr. Grant:

I am writing regarding the preliminary draft California OCS Environmental Studies Plan for Fiscal Year 1982. My comments correspond to our staff and Commission comments regarding the draft Environmental Impact Statement for proposed Lease Sale #53. In our comments, we recommended that BLM carry out additional studies in two areas.

First, BLM should study in the impact of Lease Sale #53 on the shipping traffic in San Francisco Bay, which will serve as the center of both construction and refining activity for three basins off the coast of Central California. The study should review the increased number of trips, the sizes of various boats to be added to daily traffic, and increased risk of spills of oil in the Bay environment due to increased traffic.

Secondly, BLM should expand the oil spill model (carried out by USGS) into San Francisco Bay. The study area is currently limited to the California coast outside of the Golden Gate. The Bay is one of California's greatest estuaries, and the home to a variety of land and waters uses, and wildlife habitat, all of which could be severely impacts by a large oil spill, either within the Bay or outside the Golden Gate.

We hope you will include these studies in our Environmental Studies Plan for Fiscal Year 1982. The information will assist in the development of oil spill contingency programs to protect San Francisco Bay in the event Lease Sale #53 area is developed.

Sincerely,

Margit Nickell

MARGIT NICKELL
Resource Analyst

MN/lg

cc: Mari Gottdeiner, California Coastal Commission



CITY AND COUNTY OF SAN FRANCISCO

BOARD OF SUPERVISORS

CITY HALL, SAN FRANCISCO 94102 • TELEPHONE 558-3184

June 2, 1980

California Coastal Commission
631 Howard Street
San Francisco, CA 94105

Dear Commissioners:

As members of the City and County of San Francisco's Board of Supervisors, we wish to express our opposition to the Department of Interior's Lease Sale 53 offshore drilling proposal. This proposal should be either modified significantly or eliminated altogether.

While we are very much concerned about our nation's energy supply and our dependence on foreign resources, the most optimistic documentation provided in the Department of Interior's Draft Environmental Impact Statement indicates that the basins included in the proposed lease sale contain only enough petroleum for a thirty day supply for our entire country.

In contrast, the risks to our coast from exploring and transporting this oil and natural gas are quite enormous. San Franciscans are very concerned about the future of our Bay, recreational opportunities along the coastline, and the impact an accident could have on our tourist based economy. Prudence strongly indicates that the Department of Interior delay for two years, at a minimum, this lease sale. During this interim period, the concerned agencies would have compiled more accurate data on the potential effects of any oil spill, the impact of offshore developments upon our revitalizing fishing industry, and the effects upon our shipping industry.

If the Secretary of Interior decides to allow the lease sale to proceed, it should not include the three areas where the environmental risks are greatest and the potential for energy recovery the least. Accordingly, we join with other jurisdictions in urging the Secretary to delete the Point Arena, Bodega and Santa Cruz basin tracts from this and any future lease sale. We are all very committed to our nation's energy self sufficiency, but the risks associated with this development are too great for the Department of Interior to proceed as they originally planned. We ask for your cooperation in this matter.

Ann H. Ku

John L. Williams
Sincerely,
Gail Dinduskin
Harry G. Britt
Nancy Walker

SONOMA COUNTY



DEPARTMENT OF PLANNING

Pranab Chakrawarti, Director

Mr. Tom Cooke
Bureau of Land Management
Pacific OCS Office
1340 West Sixth Street, Room 200
Los Angeles, Ca. 90017

June 27, 1980

Dear Tom,

The attached comments and Board of Supervisors Resolution are Sonoma County's response to the Draft Environmental Impact Statement for Lease Sale #53.

Please contact Mr. Toby Ross at 707-527-2931 if you have comments or questions. Thank you.

Sincerely yours,

PRANAB CHAKRAWARTI
Planning Director

Richard Retecki

Richard Retecki
Coastal Energy Impact Planner

RR:mr

Outer Continental Shelf Lease Sale 53

Review: Draft Environmental Impact Statement

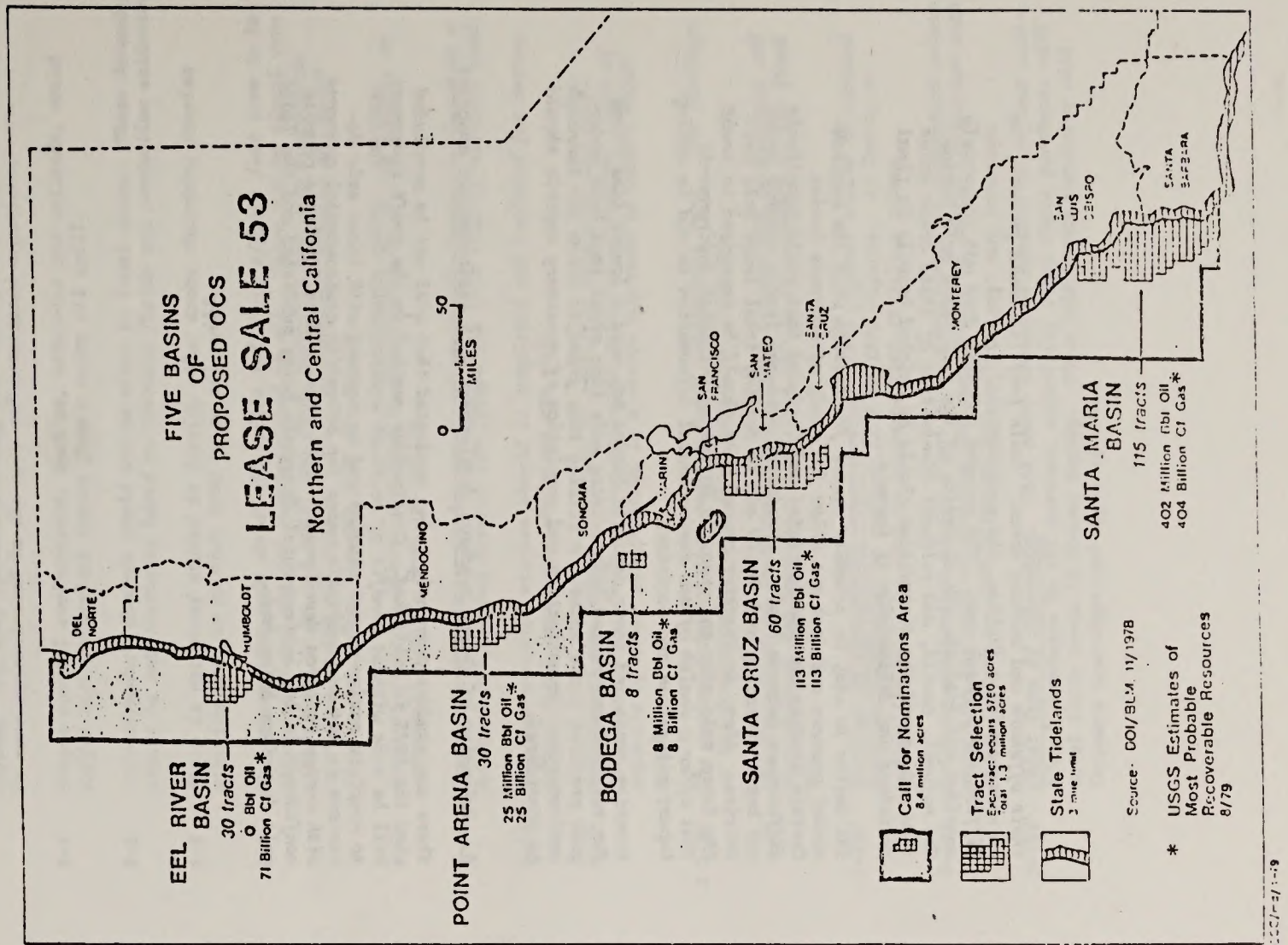
Sonoma County, California

Project Description

The proposed Outer Continental Shelf (OCS) Lease Sale No. 53, scheduled for sale in May 1981, is currently undergoing environmental review. The Bureau of Land Management (BLM) has published for review the Draft Environmental Impact Statement (DEIS) that covers the areas of central and northern California affected by Lease Sale 53.

There are five areas proposed for lease sale: the Santa Maria, Santa Cruz, Bodega, Point Arena, and Eel River Basins. Sonoma County's concerns focus on the Bodega Basin. The 8 tracts that comprise the Bodega Basin are located 11 miles southwest of Bodega Bay in depths between 360 and 650 feet and cover a 72 square mile area.

The most probable estimate of oil and gas resources by the United States Geological Survey (SGS) for the Bodega Basin are 8 million barrels of oil and 8 billion cubic feet of natural gas. At present national consumption levels, the oil resource estimate equates to 10 hours of the national daily use.



General Comments

1. Report format and organization

There is a need to simplify and clarify the environmental statement. The report format is confusing and does not make review easier or the document more understandable. Report format should be changed to present information, impacts, mitigations, and conclusions in a clear manner.

Cross-referencing and foot-noting would aid in review, and promote the idea that coordination and inter-relationships do exist in the document, and that the research for the lease sale is not being carried out in a fragmented manner.

Sections should be revised to isolate pertinent information such as graphics, results from crucial studies, and decision points. Also, concise and clear presentation of basin-by-basin information would be highly beneficial and is most desirable.

A document that offers mitigations to possible actions before describing those actions and their impacts is not acceptable and is, at best, confusing. A comprehensive environmental study and its results needs to be the report focus, and then, statement of possible mitigations. Impacts need to be stated in a clear format and objective manner.

2. Unfinished studies and necessary information

Unfinished studies and crucial information are necessary for a complete environmental review process. Without all data related to the lease sale, final decisions concerning the sale should not be made. A final environmental document should not be written with major information gaps, decisions concerning the lease sale will hold little credibility.

3. Time frame

The time frame for review of Lease Sale No. 53 should be extended to include the information and findings of all studies necessary for decision-making. Adequate time must be allowed for review and completion of all documents concerning the Lease Sale.

4. Study of separate basins

Separate analysis of the five basins in Lease Sale 53 would be a valuable asset to the Final Environmental Impact Statement (FEIS) due in October 1980. The basins under study are extremely diverse in both

their offshore and onshore areas. Basin profiles could promote, in an understandable fashion, the environmental, social, and economic differences of each area. The present document does not adequately consider and evaluate the diversity of the five lease sale basins. The natural, social, and cultural diversities of these areas makes them unique and the diversities should be weighed heavily in final decisions and delineation of impacts.

The desire to stay on schedule causes frustration with the environmental process and does not allow for study of separate basins. Certain studies are not completed and included that would accentuate differences between basins. Projected resource levels clearly point out basin diversity and should aid in setting total lease sale priorities. Also, in frontier areas, care should be exercised to treat the lease sale area and specific basins as untouched environments that offer a wealth of new environmental information to aid in making impact mitigation and decisions.

Frontier areas and their separate basins may need a longer time frame for research and review before lease sale than areas that have undergone previous lease sales. A sliding time frame to allow for thorough environmental investigation and completion of necessary reports should be considered.

5. Balancing of energy resource development with environmental concerns

There are studies currently being conducted that will not be concluded when the FEIS is published. Conclusions reached in the draft statement will be made without benefit of critical environmental input. Failure to complete environmental studies and to proceed with lease sale decisions is not an acceptable means for balancing environmental concerns with energy resource development. That process does little to promote confidence in the environmental documents being published and the lease sale decisions being made.

Specific Comments

- 1-14 Charts and diagrams are not clear throughout the report. Most need to be re-organized, explained, and graphic lay-out revised.
- 1-20 The gas in the Bodega Basin is slated for re-injection. In the High Resource estimate a route for the pipeline should be proposed and discussed at various places in the report.
- 1-35 Assurance that direct and external costs for loss of economic, social and cultural opportunities will be compensated by those companies holding lease rights.
- 1-55 Major studies either in progress or scheduled for fiscal year 1980-81 will not be available for the final EIS. The document should not be published without their inclusion.
- 1-76 A publicly reviewed oil spill contingency plan needs to be included in the final EIS.
- 1-76 Comprehensive equipment, money estimates and programs for oil spill mitigation should be included. These should be adjusted for different resource estimates, vessel traffic, and the natural characteristics of each basin. The limitations of oil mitigation measures, equipment, and distance from Central and Northern California tracts make any oil spill contingency plan seem questionable.
- 2-2 The FEIS upon completion of the contracted air quality study must evaluate the effects OCS development will have on the coastal environment. It has been proven that urban industrial pollutants will enhance and prolong periods of fog by hygroscopic nuclei increasing water particles (fog). If hydrocarbon pollutants from tankers, barges, and offshore platform activities are emitted in fog conditions, this phenomenon could occur.
- 2-3 Environmental studies of bottom characteristics, platform construction and orientation, currents, and knowledge of bottom organisms are essential to understanding the impacts of smoothing. Also, the amount and content of drilling mud being discharged is critical in estimating impacts.
- 2-8 The entire process for figuring oil spill frequency should be revised. Northern California's coastline is rugged, and climatic and physical oceanographic conditions can be severe, increased barge traffic, numerous barge loadings, and unstable geologic areas all could contribute to, or induce oil spills.
- 2-4 Kelp bed organisms may have rapid recovery rates but that is assuming a balanced biological and physical oceanographic environment. It will have to be proven that kelp beds and associated organisms will not suffer impacts by an oil spill. Kelp beds may be the first "line of

defense" and keep spilled oil away from shore, thus diffused oil could be more concentrated in the beds and associated organisms.

- 2-4 Unique coastal environments, such as, estuaries and wetlands, would suffer high ecological losses from a major oil spill.
- 2-5 Infrastructure demands would not be minor in local areas. These demands should be substantiated based on resource fields and production estimates.
- 2-6 There is not proof stated to justify other areas absorbing tourism activity lost in another area by an oil spill.
- 2-7 The assumptions made about oil spills and their effects just seem to be assumptions and are not substantiated at all. There may be visual considerations to an oil spill and there certainly are many recreation user days in the off season. Also, recreational boating and sport fishing may suffer impacts from oil spills.
- 2-10 Study of separate basins may lead to quantification of the impacts on commercial fishing from oil spills.
- 2-25 Lease Sale #53 with a 30 day supply of crude oil should be placed in a National Oil and Gas Reserve for future use in a time of national need.
- 2-28 All environmental studies should be completed and included for review before final lease sale decisions are made.
- 2-29 Deletion of the Bodega Basin may be justified solely by the small amount and low quality of the projected potential resource. Lack of emphasis of other alternatives is a narrow approach to such a major problem.
- 3-1-20 The geologic description section needs substantial work. The findings of the Geological Hazards Study should be included.
- 3-71 The Assessment of Space and Use Conflicts between OCS development and Recreational and Commercial Fisherman should be included in the final EIS.
- 3-107 Landings of Commercial Invertebrates. 1974 figures should be revised (and are available) to reflect 1978 or 1979 figures. At least, a multiplier could be used to estimate 1978-79 dollar values.
- 3-111 Prior to publication of the final EIS a transportation separation scheme should be included to mitigate the possibility of tanker collision with other tankers or with offshore facilities.
- 3-121 Coast Type of Ownership. This chart should be revised to reflect additional purchases by all parties, especially since State purchases will total 8500+ acres in Sonoma County. These additional purchases will increase user days and types of uses.

- 3-137 Cultural Resource Sites. How many sites are in each county's coastal zone? They may conflict with OCS facility sitings and other aspects of the proposal.
- 3-144-146 Distinguishing Subregional Environmental Characteristics
1. Sea Birds - Point Reyes and Bodega Bay should be included.
 2. Major Wetland Areas - add the Estero's Americano and de San Antonio.
 3. Most Important Commercial Fish Landings - Please add "albacore" to this category for the Bodega Bay Area.
 4. Population Characteristics - population density for Marin/Sonoma should be 289 people per square mile. There are not any figures available to see if the 1975-80 growth rate of 1.9% is correct.
 5. Major Recreation Facilities - the figure of 3 State Parks should be changed to 8. Marin has 5 as stated earlier in the report.
- 3-148 Land use policies and environmental protection measures on various political levels have been established to protect marina and coastal habitats. The conclusions are not correct and should be revised or deleted.
- 3-151 Limitation of subdivision growth in Bodega Bay will be done for more than just visual resource management. Transportation constraints, service capacities, use conflicts, and housing needs should also be stated.
- 3-156 Projected population and employment figures for Sonoma County in 1990 should be revised. Population estimated for 1990 will be 365,000, and employment 143,000.
- 4-1 The oil spill trajectory model is not accurate and valid for Lease Sale 53. Local climatic information in or near the lease sale area is needed to make the model useful.
- 4-12 These charts are confusing and should be clarified.
- 4-16 Please include the northern segments of lease sale: 1-16 are missing.
- 4-21 Support bases may take on a permanent character if they function for the length of the lease sale and if larger resource finds are discovered.
- 4-27 Please consider in the transportation scenarios and vessel traffic plans the projected 180 trips from San Francisco to the Bodega area of supply and crew boats. Through the exploratory stage and early development phase this adds a considerable number of trips.
- 4-45 Air quality investigation should be done for separate basins using State standards and with aid from local air pollution control districts. The proposed sale will increase air quality problems at certain periods during the lease sale. All factors need to be included and evaluated.
- 4-52 Economic models may not be able to deal with "false economies" that may be established by this lease sale. The needs and activity of the exploration stage may dissipate producing a support burden for local coastal areas. The model should be sensitive enough to estimate the needs of local areas during low, high, and risked mean resource finds.
- 4-64 Tankers and barge traffic will certainly coincide with adverse meteorological conditions at times during the lease sale.
- 4-75 More detailed information is needed on the effects of drilling mud, drill cuttings, and formation water discharges on the ocean environment.
- 4-92 A general statement is needed for seabirds in the table on page 4-92. Example: Disturbance of living, feeding, and reproductive habitats.
- 4-93 Change the Southern sea otter from a threatened species to an endangered species.
- 4-112-119 Contradictions exist as to the extent and severity of impacts from OCS development on certain marine mammal and seabird species and on sensitive coastal environments. These should be clarified prior to publication of the final EIS.
- 4-122 The Curtis Harris economic model is not sensitive enough to evaluate local economies. Basin-by-basin studies with local assistance would be more reliable and valid in establishment of economic data. The Bodega Bay area is not slated for industrial or energy development in either the adopted Sonoma County General or Local Coastal Program in progress. This is an established county policy and would need special study at the local level if that policy is to be changed. An insensitive economic model is not the best vehicle to accomplish this task.
- 4-137 Increased vessel traffic, physical oceanographic conditions, local weather conditions, and unique natural areas close to the Bodega Basin would seem to raise the probability of oil spill impacts for this area.
- 4-143 With increased acquisitions for coastal recreation facilities in Sonoma County, this table may need revision.
- 4-147 At certain times and locations the impacts from oil spills may have adverse impacts on recreation and sportfishing.
- 4-158 There may be impacts to maricultural areas such as Tomales Bay from oil spills or related OCS activities.
- 4-159 OCS activities will increase the pressure on fish and invertebrate populations. Cumulative impacts certainly will add more than a minor increase to the already existing pressures.
- 4-160 Lease Sale 53 will impact shipping and increase shipping activity.

4-179-183

Visual impacts will be significant and long-term in nature. The highly scenic areas of the California coast generate a growing tourism and recreation industry. Impacts will be felt in those activities also. Frontier areas should be evaluated differently than areas that have experienced OCS development. Visual impacts would best be treated by separate basin analysis.

4-189-195

Extraction of a 30 day resource supply with associated impacts is not acceptable based on the number and severity of impacts stated in the DEIS.

4-195

Basin-by-basin analysis of development scenario needs will be available. This section should be explicit in its statements related to land resource needs and the associated impacts from OCS activities.

4-209

These should be prepared for different resource potentials with basin-by-basin treatment. They are helpful and may be more useful in a summary document near the beginning of the DEIS.

4-217

Alternatives to the rigid requirement for the Department of Energy's production goal for the Pacific OCS do exist. The number of impacts and lack of confidence in BLM's environmental review process do not merit pursuing a 30 day supply of oil.

Conclusions

The Sonoma County Board of Supervisors:

1. Opposes extraction of a \pm 30 day low quality resource supply that will not produce long-range national benefits;
2. Finds unacceptable a Draft Environmental Impact Statement that does not adequately address the potential impacts produced by OCS activities;
3. Reinforces its current policy of not encouraging industrial or energy development within the coastal zone;
4. Promotes increased use of renewable energy sources in a national energy policy;
5. Recommends delay of the entire lease sale so that all pertinent studies may be completed and included;
6. Recommends deletion of the Bodega Basin from Lease Sale #53; and,
7. Continues to oppose the entire Outer Continental Shelf Lease Sale #53, for Central and Northern California.

THE WITHIN INSTRUMENT IS A CORRECT
COPY OF THE ORIGINAL ON FILE IN
THIS OFFICE.

ATTEST: JUN 25 1980

EEVE T. LEWIS, County Clerk &
ex-officio Clerk of the Board of Supervisors
of the State of California, & for the County
of Sonoma. By *[Signature]*

RESOLUTION NO. 6322 A
Sonoma County Administration Building
Santa Rosa, CA 95401

DATE June 24, 1980

RESOLUTION OF THE SONOMA COUNTY BOARD OF SUPERVISORS
REGARDING CONTINENTAL SHELF LEASE SALE #53.

WHEREAS the Draft Environmental Impact Statement prepared by the Bureau of
Land Management does not adequately address the potential impacts produced
by Outer Continental Shelf (OCS) activities, and

WHEREAS the OCS resource potential is minimal and of low quality throughout
the lease sale and will not produce long-range national benefits, and

WHEREAS the Department of Energy and Department of the Interior have not
adequately considered the increased use of renewable energy sources in a national
energy policy, and

WHEREAS the current policy of the Board of Supervisors is to discourage indus-
trial or energy development in the Sonoma County Coastal Zone, and

WHEREAS the value of existing coastal resources are vitally important to the
environment and economy of the coastal area,

NOW THEREFORE BE IT RESOLVED that the Board of Supervisors, County of Sonoma,
requests the Department of the Interior to delay the lease sale so that all
pertinent studies may be completed and included; recommends deletion of the
Bodega Basin from Lease Sale #53; and continues to oppose the entire Outer
Continental Shelf Lease Sale #53 for Central and Northern California.

SUPERVISORS VOTE:

KAHN	PUTNAM	RUDLE	ISPOSTI	KOENIGSHOFER
AYES	NOES	ABSTAIN		

SO ORDERED

BOARD OF SUPERVISORS

COURTHOUSE ANNEX • SAN LUIS OBISPO, CALIFORNIA 95408 • 805-549-5011

June 26, 1980

Mr. Frank Gregg, Director
Bureau of Land Management
Department of the Interior
Eighteenth and C Streets, NW
Washington, DC 20240

RE: SAN LUIS OBISPO COUNTY COMMENTS ON PROPOSED OIL AND GAS LEASE SALE
#53 DRAFT EIS.

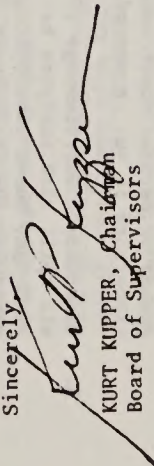
Dear Mr. Gregg:

San Luis Obispo County has conducted a specific review of the Draft EIS for proposed Lease Sale #53. Attached is the culmination of that effort reflecting the County position, comments and recommendations on the sale and the Draft EIS. This includes an adopted resolution of the County Board of Supervisors and an accompanying position paper. The position paper expands on the resolution and includes a detailed page-by-page critique of the DEIS.

This County position was prepared on the basis of extensive consultation with affected individuals, agencies and organizations and through numerous public information meetings and workshops.

We are very concerned these comments will not be given adequate consideration in the Final EIS and the subsequent lease sale decisions. Our previous recommendations have not been acknowledged. This position statement identifies a number of major concerns on the adequacy of this document as well as the preferences and recommendations of local government that has previously been identified but remain unchanged. We hope these recommendations and comments receive appropriate consideration in the Final EIS.

Sincerely,


KURT KUPPER, Chairman
Board of Supervisors

KK:RD:ca

Attachment

cc: - Pacific OCS Office, BLM
- Governor's Office of Planning & Research
- California Coastal Commission (State)
- South Coast Regional Commission
- California State Lands Commission
- Local Government OCS Coordinator
- Congressman Leon Panetta

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Members of the Board
HANS HEILMANN
STEVE MAC ELVAINE
KURT P. KUPPER
HOWARD MANKINS
JEFF JORGENSEN

SAN LUIS OBISPO COUNTY POSITION STATEMENT ON PROPOSED OCS LEASE SALE #53 AND ITS DRAFT ENVIRONMENTAL IMPACT STATEMENT

This Position Statement has been prepared on the basis of extensive consultation with individuals and organizations involved or affected by offshore oil and gas development. Three sections are provided: a general critique of the Draft Environmental Impact Statement (DEIS), recommendations to the BLM, and specific page-by-page comments on the DEIS.

GENERAL COMMENTS

The DEIS appears to be an improvement over the Preliminary DEIS. It is still seriously deficient in a variety of ways. An initial criticism is that the vast majority of our comments on the Preliminary DEIS have not even been acknowledged. Many of our original concerns remain unchanged and are outlined in a general manner below and elaborated in the Specific Comments Section.

1. One of the most disconcerting aspects of the DEIS is the manner in which the information is presented. There is an obvious bias reflecting what appears to be an justification for the project. In many instances the information is presented in a manner to play down or reduce the potential adverse impacts. An example: On page 4-89 in describing the probabilities of an oil spill hitting a shoreline, a statement is made that "only three shoreline segments." The adjective 'only' is an evaluating comment. It also fails to note these segments include over 100 miles of some of the most significant and biologically productive portions of the Santa Barbara and San Luis Obispo coastlines. An EIS should be presented in a factual manner avoiding such evaluative comments.
2. The DEIS is written in very broad, generalized terms. A specific-tract-by-tract analysis is not included even though such an analysis is necessary to determine which tracts should or should not be leased and under what conditions. This lack of specification is prominent throughout the document from the description of the environment, to the identification of adverse effects.
3. It's encouraging to note that two alternatives (2 and 3) have been provided to delete blocks of tracts as environmental mitigation measures. It is disappointing, however, that the available information has not been utilized effectively in the deletion or imposition of mitigating conditions on specific tracts. This is even more disturbing in light of the acknowledged lack of data (Appendix I) and uncompleted studies (Appendix II) in the area. Two of the most serious shortcomings are geohazards and high yield or prime commercial fishing grounds as elaborated in our specific recommendations and specific comment section.
4. The DEIS is also seriously deficient in terms of identifying potential adverse impacts and more importantly in developing appropriate conditions to mitigate these impacts. The operating premise appears

to be the BLM "standard" mitigation measures will adequately mitigate all potential adverse impacts. There appears to be a number of serious shortcomings in these conditions which are elaborated in our recommendations.

5. Significant shortcomings in the socio-economic air quality and the oil spill risk analyses has not been corrected or even acknowledged, although, these shortcomings were identified by numerous respondents reviewing the Preliminary DEIS. These shortcomings and omissions have resulted in either incorrect or highly misleading conclusions on socio-economic impacts and oil spill risk rendering much of the EIS inadequate.

Socio-economic

- County-wide versus localized impact analysis.
- No evaluation of the socio-economic impact resulting from the violation of National Clean Air Standards.

Oil Spills

- Uses generalized wind and ocean current data to determine oil spill movement (nearshore specific data will not be available for 2 years).

- Does not include an evaluation of the shore-hit probabilities of an oil spill from the proposed offshore storage and treatment facility or a marine tanker loading and unloading operation.

- Does not evaluate the increased risk of oil spills resulting from the lack of adoption of vessel traffic routes.

- Lacks an adequate evaluation of the present "State of the Art" oil spill clean-up and recovery technology which is not effective in the moderate seas and wind conditions of the central coast.

Air Quality

- Lacks an evaluation of the high resource potential and therefore the worst case scenario.
- Lacks an evaluation of the allowable doubling of emissions every 3 miles from shore.
- Does not include the best available air quality data.
- Does not identify the potential for violation of National Clean Air Standards and resultant change to "Non-Attainment" status.

6. The identification and evaluation of onshore effects are extremely vague or non-existent. There is no specific discussion, for instance,

of the siting and service requirements of required service bases, oil and gas processing facilities, marine terminals and other associated facilities.

7. Alternative oil transportation systems result in significant differences in oil spill risks, air pollutant emissions and taxation revenues. Our initial recommendations has not been incorporated or even acknowledged in the DEIS. Those include the need to evaluate the potential expanded use of existing marine terminal (petroleum tanker loading) operations, as well as the County priority for onshore oil and gas processing facilities.

8. The DEIS lacks a balanced evaluation of alternatives to the proposed action. The most flagrant and bias evaluations concern the benefits of delaying the sale and placing the area into a petroleum reserve. As aforementioned, the DEIS does not include specific tract-by-tract deletions for either environmental or safety reasons.

9. The DEIS does not identify the BLM recommended alternative. This is an absolute necessity for a respondent to adequately address the most probable development scheme. This identification is further required by the Council of Environmental Quality Guidelines for the implementation of the National Environmental Policy Act which became mandatory by executive order in July, 1979.

RECOMMENDATIONS

1. Adopt Alternative #4 - Delay the Sale, and an alternative placing the Santa Maria Basin into a National Petroleum Reserve for future use.

Delay the Sale

The DEIS admits that the Central California coast is among the most poorly studied shelf areas of the United States. To provide this necessary information the BLM is conducting an extensive environmental studies program (see Appendix I). A number of literature-search studies have been completed as well as several predictive studies including an oil spill risk analysis. Unfortunately, a socio-economic analysis and a air quality analysis. Unfortunately, specific base data on wind and ocean currents and local socio-economic information was not available for use in the studies resulting in conclusions of questionable reliability. Studies still underway include a 3-year Marine Mammal and Seabird Survey and a Geologic Hazard Study. Major studies scheduled in the future include a Risk Assessment of Wetlands, Coastal Areas and Hard-bottom Benthic Habitat; Fish, Shellfish and Pinniped Effects Studies; and on Onshore and Offshore Fishing Use Conflicts. In light of this absent data (see Appendix II - Environmental Studies Status Report) it is not possible to adequately assess the impacts of OCS oil and gas development in this region.

A delay in this sale, in addition to allowing time for completion and public review of these studies, would allow time to test the

adequacy of proposed air quality regulations, complete studies on Vessel Traffic Schemes, and allow technology to improve present drilling, transportation, and oil spill cleanup technologies. A delay, does not preclude development, but allows the time to complete the studies necessary to balance resource productivity with environmental risk.

National Petroleum Reserve

The County strongly urges the BLM to consider placing the Santa Maria Basin into a national petroleum reserve. This recommendation has been made by many local governments affected by the sale and the California Republican Congressional Delegation and impending legislation submitted by Congressman Leon Panetta. We strongly disagree with the manner in which BLM has analyzed this alternative. Specifically, the DEIS evaluates this alternative on the premise of a lease sale followed by a National Petroleum Reserve status. As correctly noted, based on this premise, the reserve status would result in a lack of industry incentive to develop the field. Local governments recommendation, however, specifically requests a federal exploration program in lieu of a lease sale to identify the extent, type and location of petroleum resources followed by placement into a national reserve. The reserve would be established for a set period of time or under such conditions that it can be reserved for future use. Such a concept has been in use in other areas including the Elk Hills Naval Reserve and the Alaskan National Petroleum Reserve and could be implemented on the Central Coast.

We also strongly disagree with the BLM assertion that this sale is necessary in order to contribute our fair share of resource productivity and environmental risk. For rural counties, San Luis Obispo and Santa Barbara, are contributing more than their "fair share." A major Nuclear Power Plant and Liquefied Natural Gas Terminal are presently under construction in this area - both facilities serving statewide needs. Practically the entire Santa Barbara Channel has been subject to past OCS sales and may see additional future sales. Accelerated onshore production is presently underway with local approvals based in part as an effort to "buy" time from oil production on the OCS. Numerous state and locally-mandated energy conservation and alternative programs have been instituted. We believe these programs and actions represent a willingness to provide our fair share of resource benefits and environmental risks. Placement of this area into National Petroleum Reserve does not preempt petroleum production, for the opportunity for future development will always remain open.

2. Cancel the Sale unless proposed Air Quality Regulations can assure compliance with National Clean Air Standards.

San Luis Obispo County's air quality is delicately balanced between attainment and non-attainment of the Federal Ozone Standard and we are presently in violation of State Clean Air Standards. The County has developed an Air Quality Maintenance Plan to assist in maintaining air quality as well as a stringent New Source Review

Rule which applies to new onshore sources. It is inequitable that clean air increments paid by onshore sources will be used by OCS operations resulting in the imposition of other expensive control measures to offset OCS operations. Because of limited onshore trade-offs offsetting OCS emissions may be impossible triggering non-attainment status and federal sanctions under the Clean Air Act. Such sanctions include the prohibition of new polluting industries as well as the withholding of federal funds for such projects as state highways, water projects and sewer systems and plants, potentially resulting in a federally imposed building moratorium. The socio-economic implications of violating these standards are so pervasive they must be accurately evaluated before the DEIS can be determined adequate.

3. Delete specific tracts on the basis of inherent unacceptable risks or potential pervasive conflicts with coastal and marine resources.

Because of limited analysis in the DEIS and the lack of important base studies, the environmental consequences of OCS oil and gas development in the Santa Maria Basin cannot be adequately addressed at this time. Inasmuch as the BLM has been resistant to adopt the aforementioned alternatives and in-light of the inadequacy in a block approach to tract deletion, the following attempts to minimize identifiable conflicts and adverse impacts by recommending specific tracts for deletion. This may be a partial list, subject to change, as more information becomes available.

This evaluation included the following major factors: geologic risks, vessel traffic conflict, priority and high yield commercial fishing grounds, and various buffer zones for shoreline resources and isolated tracts. Each factor has been evaluated using the best information available to staff in consultation with applicable disciplines and organizations. The resulting recommended deletions are based on the premise of deleting tracts that presently appear to have inherent risks or potential pervasive conflicts with coastal resources. Appendix III includes maps for each of these specific siting constraints.

Delete the following tracts located within or bisected by the Hosgri Fault Zone:

131	143	151	168	E4 196
134	146	155	175	203
138	147	E4 161	189	

This fault zone forms a faulting area approximately 12.4 miles wide and over 55 miles long. Along the eastern edge of the Santa Maria Basin. Large variations in thickness of geologic units across parts of the Hosgri fault zone indicate active lateral movement. Several thousand feet of vertical movement also occurs locally along the zone (H.C. Wagner, USGS, 1974). Major outstanding problems of this fault zone include the details of fault location, continuity between the Hosgri and San Gregorio fault elements, offset history on each segment, evidence for holocene movements and seismicity

(Silver, 1978). Geologist C.A. Hall (1975) concludes the San Simeon-Hosgri fault zone could be a potential hazard to any engineered structure located along the coast from San Simeon south to the vicinity of Purisima Point

Delete the following tracts located within active subsea slump and landsliding zones: (Appendix IIL, Map 1)

156	158	162	164	192
157	159	163	185	

Significantly large areas have been identified by the U.S. Geological Survey as prone to active landsliding and mass sediment movement. A site-specific map identifying these areas was transferred from sunakar USGS maps in Menlo Park. D. McCulloch of the USGS (1980) indicates buried soil failures beneath other surface failures, which characterize this zone, indicate repeated failures in the area. Instability of the sea floor whether from seismic activity such as fault rupture and earthquake-induced or sedimentary process-induced ground failures, is recognized in the principal hazard to emplacement of platforms and pipelines in the marine environment (D. McCulloch, USGS, 1977). McClellan Engineering in their geologic report on LS #48 comments "the detection of landslides is positive evidence that unstable slopes are present in the area. Although such areas may be possible to develop, the lack of environmental studies in this area, and the close proximity of these areas to high-yield commercial fishing grounds and the most sensitive portion of our coastline (rocky intertidal between Shell Beach and Morro Bay) and the predominate wind pattern that tends to push oil spill to shore, makes the level of risk unacceptable.

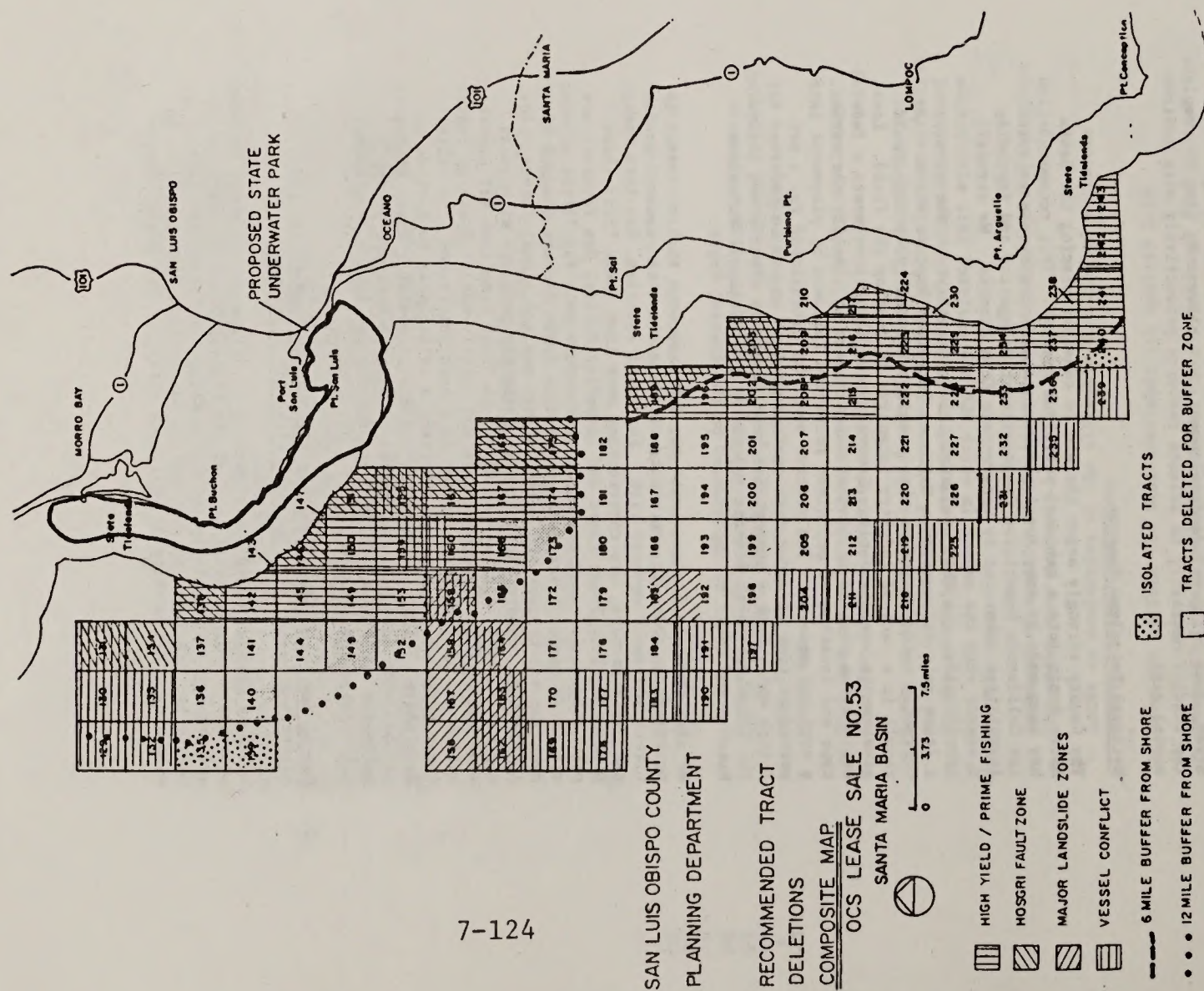
Delete the following tracts that may conflict with major vessel traffic routes: (Appendix 11, Map 1)

Seaward Tracts:	183	204	225
	<u>162</u>	211	231
	169	218	235
	176	219	239
	177		

Port Routes - Estero Bay:	129	131	133
	130	132	

Port Routes - Port San Luis

Significant increased probabilities of oil spills may result from platforms being placed in traditional shipping lanes. To minimize this risk the Port and Tanker Safety Act of 1978 requires the U.S. Coast Guard to conduct a vessel traffic route study and establish safe vessel traffic lanes. This Act requires the Coast Guard to



give paramount consideration to navigation in making such determinations. The final lane designations and regulations are not scheduled for completion until after the date for proposed LS #53. Several alternate routes are presently under consideration - a vessel traffic lane immediately outside the leasing area and another alternative somewhat closer to shore following traditional shipping routes. The lanes would be voluntary so direct routes have the most favorable prospects for compliance. LS #53 should not preclude the Coast Guard option from designating the traditional traffic routes which would provide the most compliance and safety. For this reason the seaward tracts should be deleted from this sale. In as much as Post Access Routes are still in the study stage, all tracts with direct routes to Estero Bay and Port San Luis should also be deleted. Presently over 175 petroleum tankers service Estero Bay with approximately 90 tankers servicing Port San Luis every year. The DEIS estimates "...the number of vessel accidents during the proposed sale, development, and production could be small unless the...traffic scheme is not established." (p. 2-7, 2-8)

Delete the following tracts located in high-yield/high priority Commercial Fishing Grounds:

138	153	168	209	228	242
142	154	174	210	229	243
143	155	175	215	230	147
145	159	189	216	234	
146	160	196	217	E $\frac{1}{2}$ 237	
149	161	202	E $\frac{1}{2}$ 222	238	
150	166	203	223	E $\frac{1}{2}$ 240	
151	167	209	224	241	

The DEIS does not adequately assess the potential offshore fishery yield losses that may result to the commercial fishing industry. A pipeline shroud condition and the fishermen's contingency fund has been provided as measures to mitigate potential losses to this industry. These are wholly inadequate. According to local fishermen, previously from the Santa Barbara area, the primary problem with OCS development is the placement of platforms in prime fishing areas that may preclude a trawl run and the oil related debris and equipment that may snag bottom trawling nets. This has been identified as the major reason which has precluded fishing in one of the prime habitat beds in the channel. The Fishermen's Contingency Fund is available for reimbursing losses but has so many shortcomings as to make it useless as a mitigation measure. For this reason the County coordinated with the Local Fishermen's Associations and the California Department of Fish and Game to identify tracts for deletions. Priority fishing grounds were defined, that if lost or heavily impaired as a result of platforms, pipelines or oil-related debris, would have a significant adverse impact to the local commercial fishing industry. Fisheries of limited range such as the high value Prawn shrimp grounds were also identified. Finally, California Department of Fish and Game Fish Catch Statistics were average over a three year period, calculated and mapped to identify

the highest yield fish catch counts per tract for both total fish catches and fish caught with bottom trawling gear (those most susceptible to conflicts with OCS development). The aforementioned recommended tract deletions were based upon this composite information.

Delete the following tracts located in isolated area:

135	139	W $\frac{1}{2}$ 240
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Once the tracts have been deleted for the aforementioned reasons, several periphery tracts remain that are relatively isolated from the remaining block of tracts. These periphery tracts should not be leased due to their remote location, their need for extended services and pipelines, and relative proximity to vessel traffic lanes, prime fishing grounds sensitive environmental habitats and the Hogri faulting zone (minimize the number of petroleum pipelines crossing this fault zone).

Establish a 6 mile buffer zone (3 miles seaward of the state limit) between Oceano and Point Conception.

This would result in the deletion of the following tracts:

189	210	224	E $\frac{1}{2}$ 233	$\frac{1}{2}$ 240
E $\frac{1}{2}$ 196	216	E $\frac{1}{2}$ 228	234	241
203	217	229	237	242
209	223	230	238	243

According to the DEIS this alternative is designed to reduce air quality impacts by 1) decreasing the total pollutant emissions and 2) increasing the distance between OCS sources and onshore receptor areas. By applying this alternative along the entire basin the DEIS estimates the alternative would reduce onshore worst case impacts by 50% though does not substantiate this. The additional buffer beyond the 3 mile state authority zone would also allow an extra 3-6 hours before an oil spill reaches shore. According to the DEIS, this would allow additional time for dissipation of some of the oil and the application of oil spill containment and recovery equipment. This alternative also overlaps a portion of the Number 1 priority commercial fishing grounds as identified by the local fishermen's association and the Department of Fish and Game. The provision of this buffer would also reduce visual impacts by increasing the minimum distance between platforms and the shoreline from 3 to 6 miles. Finally the buffer zone would increase the distance between offshore oil and gas operations and the following: seabird nesting, roosting and feeding areas, the Santa Maria River mouth, the Pismo Beach State Recreational Area (3.9 million annual visitors), the Pismo Clam refuge, the Nipomo Dunes National Natural Landmark, and the Gray Whale migration route. The U.S. Geological Survey anticipates that a relatively low resource potential exists in the tracts proposed for deletion. (p. 2-12)

Establish a 12 mile buffer zone from two underwater parks proposed by the State of California from the Shoreline to the 50 fathom line extending from Morro Rock south to Souza Rock (offshore Shell Beach).

This area represents some of the most significant productive and pristine coastline in San Luis Obispo County. This alternative would delete the following tracts:

131	140	146	152	165
133	141	147	153	167
134	142	148	155	168
136	143	149	159	173
137	144	150	160	174
138	145	151	161	175

The purpose of this additional buffer zone is to provide additional protection for this important area. The Coastal Commission has found in their review of OCS exploration and development plans in Southern California that the state-of-the-art oil spill containment and cleanup equipment does not provide against the spillage of oil and is not effective in even moderate sea conditions, currents and winds. It is common knowledge that the wind and sea conditions of the central coast are a world apart from those found in Southern California. Because of the deficiencies in oil spill cleanup technology, the flaws in the oil spill risk analysis model described in our specific comments), the wind-driven currents that tend to push an oil spill to shore, and the lack of completed studies in this area, we maintain a minimum buffer zone of 12 miles is crucial to the adequate protection of these resources.

According to calculations in the DEIS, this would provide approximately 12-24 hours of protection before an oil spill came onshore and possibly longer with favorable ocean currents and calm seas. This additional buffer from the proposed underwater park will also decrease the projected 12-16% probability (BLM, Alternative #3) of a shoreline oil spill hit along this valuable and inaccessible portion of the coast. Within and immediately adjacent to the proposed underwater state parks is the highly productive scenic and pristine coastal terrace from Shell Beach to Islay Creek. This area is characterized by productive rocky intertidal and kelp bed habitat interspersed with numerous offshore rocks. Should an oil spill come ashore in this area it would be impossible to clean up with potentially disastrous biological effects to marine mammals, seabirds, and rocky-intertidal sea life. Valuable submarine resources in this area include the Santa Rosa Reef, the coral communities offshore Point Buchon, and some of the highest yield commercial fishing tracts in the Santa Maria Basin. The entire area is heavily utilized as key marine mammal and seabird breeding and roosting areas. Some of the most important offshore rocks in the area is Lion and Pecho Rocks which has had sea lion counts of 1,350 and 500 respectively and serve as major bird roosting rocks. The California Sea Otter is commonly found throughout this area south to Shell Beach. Up to 200 otters have been counted off Point

Buchon. Of utmost importance to this area is the Morro Bay Estuary. This estuary is one of the most valuable and best preserved estuaries in the state. It serves as a major stopover for migratory birds on the Pacific flyway and as a major marine nursery for the entire area. Two major mariculture industries are also found in this area, the Morro Bay Oyster Farm, and the Cayucos Abalone Farm, the only commercially successful abalone farm in the nation.

In addition to providing some additional protection to these resources, the buffer zone would also substantially reduce projected worst case onshore air quality impacts as well as the visual impact in this pristine coastal area.

4. Require mandatory redefined biological and cultural resource lease sale stipulations.

The suggested stipulations are unacceptable as presently written and should be amended as follows:

- A. The stipulations should be mandatory, requiring each leasee to conduct site-specific surveys to assess the presence and provide protection for important cultural and biological resources. The broad, regional environmental and cultural studies in process or proposed will not provide the level of review necessary to determine whether valuable or important cultural or biological resources exist within each 9 square mile tract. Only site specific surveys can provide this level of review. As these resources are within the public domain, the public has the right to insist on their full protection by those who may endanger the resource.

The DEIS in fact identifies the need for these mandatory stipulations. On page 2-4: High ecological damage from normal development and operations are not expected for most biological resources, possible exceptions are undiscovered benthic areas which could contain unique assemblages or species and certain hard bottom areas. In reference to cultural resources the DEIS states on page 2-11, "Physical disruption would occur if construction activities took place on an undetected or ignored cultural site."

- B. The prescribed biological survey and cultural resource survey requirements should be specified in the stipulations.
- C. Protection should also be provided for highly productive, diverse or complex ecosystems.
- D. Approval of all site-specific surveys should be conditioned upon consultation with persons expert in assessing biological and cultural resource importance and representatives of the Native American community (cultural resources only).
- E. Provisions should be provided to appeal the decision of the USGS Supervisor to the Secretary of the Interior.

5. Require a mandatory, redefined geological lease sale stipulation.
An alternative to a mandatory stipulation is to require the USGS geological hazard study to be expanded to identify all potential geological risks and impose this stipulation on all applicable tracts. (A detailed discussion of these hazards are provided by McClelland Engineering in their interpretation of geological hazards for Lease Sale #48.)
The following geological hazards has not been identified in these geohazard maps and suggested studies:
 - A. Submarine Canyons and Channels - Wall slopes of such canyons are highly susceptible to sliding. Unusually high current velocities and turbidity currents sometimes occur in submarine canyons.
 - B. Slopes of 4% or Greater - Generally susceptible to mass wasting.
 - C. Hard and/or Irregular Seafloor - Generally poses unique problems for the pipeline and platform designer.
 - D. Buried Channels - Fill material in channels often has sharply contrasting geotechnical characteristics from adjacent areas.

The stipulation should also be amended as follows:

 - A. Define the types of studies necessary for each of the aforementioned risks as well as areas of concentrated shallow gas, submarine landslides and earthquake faults.
 - B. Provide a provision imposing the requirements of this stipulation along the entire subsea route of any proposed pipeline. This is necessary as the present provisions of this stipulation only provide for detailed pipeline survey studies to the boundaries of the leased tract. It does not require a continuation of these surveys along the entire length of the pipeline.
 - C. Provide a provision requiring an assessment of alternative pipeline routes for determining the route that minimizes geological hazards.
6. Require a lease sale stipulation requiring consolidated on-shore oil and gas processing and transportation facilities for OCS oil.
The technology presently exists for processing OCS oil and gas on an offshore storage and treatment facility (OS&T). This is the preferred alternative suggested in the DEIS. However, prior analysis performed by the State Coastal Commission and Santa Barbara County has indicated a much higher risk of an oil spill from such facilities, as well as a higher potential for increased air pollutant emissions. This is due to the significant differences in air pollution onshore in relation to those offshore in federal waters. A secondary benefit of an onshore facility is the additional tax revenues that will accrue to the County.

It is also a necessity to invoke a provision in a lease sale stipulation requiring the leasees to consolidate their processing to a single site onshore. This condition, in conjunction with Local Coastal Plan policies will eliminate the proliferation of small processing facilities common on the Santa Barbara Channel Coastline.

Finally, the stipulation should require the leasee to utilize an onshore pipeline to transport OCS oil and gas to market. Previous studies have indicated a significant reduction in the probability of an oil spill using an onshore oil pipeline rather than a marine terminal and tanker operation as well as a significant reduction in air pollutant emissions. Such a requirement is presently an adopted policy of the governor and should be reflected as a lease condition.

7. Require a lease sale stipulation requiring a centralized oil spill cleanup base in San Luis Obispo or Northern Santa Barbara County.
Presently OCS orders require a specified amount of oil spill cleanup and recovery equipment and an oil spill contingency plan for each platform, marine terminal and oil processing facility. Additionally, oil companies normally pool their resources in a voluntary cooperative to consolidate expensive oil spill cleanup and recovery equipment in a centralized base. The DEIS discusses the cooperatives in Southern California as examples of the type of trained personnel, equipment and expertise that will be required before development is allowed to proceed in this area. No evidence, however, has been found to require such a cooperative. In the event of a large oil spill, a centralized base in the vicinity of the Santa Maria Basin could perhaps save several hours of travel time allowing ready use of necessary equipment to prevent a spill from reaching a shore area. A centralized base in this area appears to be a minimal safeguard to protect our valuable coastal resources and economy.
8. Require a mandatory air quality lease sale stipulation.
The DEIS does not conclude whether OCS development will result in violation of onshore air quality standards. Nor does the DEIS substantiate the ability of a six mile buffer to reduce worse case air quality impacts by 50%. To ensure offshore oil and gas leasing does not seriously impact air quality the stipulation should require:
 - A. All potential emission sources shall have an air quality impact analysis including cumulative impacts.
 - B. All mitigation measures necessary to ensure all air quality standards or increments of air quality deterioration are not exceeded.
 - C. Pre-construction and post-construction ambient air quality monitoring shall be required at the points of predicted maximum onshore impact.
9. Alternatives to designating Port San Luis and Morro Bay as a potential major onshore OCS supply base must be identified and evaluated.

Possible choices include Port Hueneme and the proposed major supply base in Gaviota. This facility is inappropriate in either of the County harbors. A major supply base requires an all-weather harbor (on the central coast) and adequate moorage, wharfage and land (10-70 acres) which does not exist without significant conflict and dislocation with the existing tourist, recreational and commercial fishing facilities and activities. Adequate rail and highway access is required, yet is unavailable or nearing maximum capacity.

SPECIFIC COMMENTS

PART I - PROPOSAL DESCRIPTION

Description of Proposal

Page I-4

"Subsection 18 which requires...." This section also requires a balancing of environmental impacts, benefits and costs, etc., as well as developing a schedule indicating "the size, timing, and location of leasing activity."

I-6 "In response to the Call for Nominations...." Failure to note intensity of public interest, extent of negative nominations; discussion appears biased.

Projected Transportation and Markets

I-1,19

"(OCS L.S. 53) oil...is assumed to back out an equal amount of either foreign or Alaskan imports to California..." How was this deduced considering that some oil companies are closing down existing onshore producing wells in the Santa Maria area because of the poor market for high-sulfur heavy California crude? In addition, because there is no comprehensive federal energy program, the assumption that oil will be backed out cannot be substantiated.

I-1,20

Gas and oil from the Santa Maria area is assumed to be transported to an offshore storage and treatment facility, then piped ashore. Since storage and treatment offshore is optional, the reasoning leading to this assumption should be fully explained.

I-20

Due to the variety of potential adverse impacts resulting from location of petroleum-handling structures on the OCS, we strongly suggest that facilities be sited onshore wherever possible. Offshore storage and treatment facilities contribute unnecessarily to hazards of oil spills and shipping accidents.

Proposed USGS air quality regulations for OCS operations in addition, do not provide for the same rigorous control of air pollutant emissions currently required for onshore sources by EPA, state and local agencies. Because OCS air quality impacts onshore in the vicinity of the Santa Maria basin are anticipated to be significant, these impacts should be minimized by locating facilities where best control of emissions can be achieved, i.e., onshore.

This recommendation has been requested in comments on the Preliminary DEIS and the Transportation Scenario and, contrary to your statement (p. 1-9), they have not been incorporated in this document.

I-1,20

"Incentives would likely arise" causing refineries to invest in desulfuring equipment. This is completely unsubstantiated, and cannot be merely assumed. The entire subject of processing, distribution and marketing of the sulfurous heavy crude expected from this OCS region has been treated casually in this document, and must be carefully addressed before reaching any conclusions about the need for this oil.

- I-24 The statistically expected number of oil spills should also identify the number of spills of less than 1,000 barrels, (153-230).
- To reiterate once again, there is not sufficient room, appropriate access or parking available to accommodate a major onshore service base in Morro Bay or Port San Luis. To indicate the possibility of siting such a base in this area is incorrect, misleading and contrary to proposed local Coastal Plan policy. We continue to suggest the use of Port Hueneme or the proposed service base in Gaviota as a major base to serve the Santa Maria Basin.
- I-55 Table I.B. 4-1 should also identify when these studies will be available for public review.
- Mitigation Measures
- I-57,59 We continue to request this section be expanded to discuss the effectiveness and shortcomings of these orders as mitigation measures.
- I-60,71 Expand section to discuss the effectiveness and shortcomings of the Standard Lease Stipulations as the title implies rather than a mere listing of the stipulations. These stipulations should also be amended as specified in our recommendations.
- I-71 Latitude and longitude coordinates of subsea structures should also be designated in "LORAN C" to provide optimal use for commercial fishermen.
- Other Mitigating Actions
- I-72,76 Expand section to objectively discuss the effectiveness and shortcomings of the Contingency Plan, Oil Spill Fund, and Fishermen's Contingency Fund as well as suggestions for improvement.
- I-72 DEIS should note the jurisdictional 12 mile limit of the Federal Water Pollution Control Act.
- I73 DEIS notes an oil spill cooperative "...will be required before development will be allowed to proceed..." However, it doesn't indicate their purpose, how it will be required, the necessary equipment, or the proposed location. Inasmuch as this is a significant concern in this area, an elaboration of this cooperative emphasizing the above should be provided.
- I-76 OCS Orders 2, 5, 7 and 8 deal with preventative equipment as a part of drilling equipment. These orders do not address oil spill contingency planning. An oil spill contingency plan should be developed for public review and inclusion in the Final EIS.
- PART II - ALTERNATIVES
- Additional Alternative
- As previously described in our recommendations, we strongly urge consideration of specific tract deletions in the Final EIS. We feel this specific tract-by-tract analysis is far superior to the broad generalized alternatives provided in the DEIS. It is also crucial to consider all potential conflicts

at this time which the block approach misses. Once the tracts are leased, they represent an inferred right to develop significantly reducing the probability of tract deletion after the lease sale.

Hold the Sale Alternative

II-1,11

The summary of impacts should be entirely rewritten in light of the specific recommendations and comments made in the prior and following sections. The additional analysis would in most cases result in a change in the conclusions.

II-2

The summary on Air Quality Impacts is seriously deficient and misleading. For some reason, it has even omitted the following findings on cumulative air quality impacts identified on page 4-72: "The cumulative impact of existing conditions, coupled with Sale #53 activities could significantly aggravate existing violations for ozone in Bodega Bay, Santa Cruz and Santa Maria areas. This net increase in ozone levels could delay (emphasis added) the attainment of the Air Quality Standards in these areas."

This entire section plays down the need for maintaining the standards, dismisses the resultant implications for violation, and provides a "delay" that legally and practically does not exist. Inasmuch as the National Ambient Air Quality Standard (NAAQS) for ozone is barely attained, a likely impact from OCS air pollutant emissions will be new and additional NAAQS violations, triggering Clean Air Act requirements for expensive and currently unnecessary onshore emission controls to again attain the standard. In San Luis Obispo County for hydrocarbon emissions alone, additional onshore control costs have been estimated at \$6,000,000. Proposed USGS air quality regulations for OCS activity, less stringent than current onshore regulations, make no provision that the cost be borne by the sources producing the additional emission, i.e., OCS petroleum facilities.

The County Air Pollution Control District has estimated that due to the lack of onshore tradeoffs the likelihood of achieving these standards is very small. Continued violations will result in the imposition of federal sanctions against the County resulting in the foreclosure of new industry and the withholding of federal funds for highway, water, and sewer projects. In effect this could result in a federally-imposed growth moratorium. Such effects, however, are not even acknowledged in the DEIS, after repeated requests from San Luis Obispo County and local environmental groups.

IS #Sale 53 "could add a significant increment to existing SO₂, NO₂, particulate and O₃ levels in some areas. These impacts would be reduced below levels considered significant by DOI imposed mitigation measures." The latter conclusion certainly cannot be substantiated until the U.S.G.S. air quality regulations become final; the effectiveness of proposed regulations has been questioned by onshore air quality agencies. This conclusion should be conditioned or withdrawn until the question has been resolved.

II-3

The lethal and sublethal effects from formation water and drilling mud and cuttings should be known prior to any sale. Such information gaps should be identified under Alternative #4, as reasons for delaying the sale.

- II-3 If a large spill were to occur and an estuary, wetland or sea otter habitat was affected, major ecological losses would (not could) occur.
- The U.S. Fisheries and Wildlife Service in their response to LS #35 has stated that: "If oil from a large spill were to enter an estuary, extremely adverse biological impacts could result, including elimination of several endangered bird species and certain temporary and permanent floral and faunal species." Such an event would also result in the destruction of nursery ground and valuable habitat. The DEIS should be revised to correctly identify these possible adverse impacts.
- II-4 Practically every organism excluding fish has been identified as not expecting to suffer high, long-term impacts from an oil spill. This is a questionable statement, in light of the absence of studies, requiring clarification and specification.
- II-3,5 The description of potential adverse impacts from an oil spill and the accompanying clean-up operations tend to understate the potential impacts and should be corrected. The EIS for LS #35, for example, indicates damage from a large oil spill could be severe (not moderate) to a rocky intertidal area. Smothering is the principal cause of damage to upper intertidal species where all oiled individuals will die. Reproduction and repopulation will be retarded for several months, and the extinction of rare endemics is a possibility. Biological recovery will take up to five years with the time necessary to return to its former biological condition unknown. In addition, clean-up operations of intertidal areas could cause total destruction of the rocky slope communities and significantly harm the communities of the sandy beach areas actually cleaned.
- II-5,6 The section on socio-economic effects reflects the findings of regional socio-economic impact analysis which tends to mask the real impacts. At a countywide level, the impacts may be rather small; however, they may be very significant within a localized community or along the coastal zone. The resulting impacts are not only a function of the change in the level and composition of jobs and population in the region, but also the location of major employment centers. If they are concentrated in a single area such as the Santa Maria river, the impacts of a population increase of 10,000 could be serious. The DEIS states there would be little in the way of infrastructure stress. Again, this is conclusions based upon a regional analysis with little applicability to local concerns. The actual conditions are subject to the location of the employment centers and present service capacity. Inasmuch as a number of coastal communities are presently experiencing service-infrastructure based moratoriums, the likelihood of infrastructure stress may be high for a given locale.
- II-5,6 The most significant omission in this section, is the socio-economic implications of violating state and national Air Quality Standards. This has been noted time and again to the BLM only to be ignored in the DEIS.
- II-6 The statement, "Tourism over the total sale area will be relatively unaffected by the impact of a spill in one location, as the local reduction will tend to be absorbed by the rest of the sale area" tends to play down these impacts. Based upon the contribution the tourist industry plays in our local economy, such an action could have severe effects to the local
- economy and must be identified in the EIS. The Santa Barbara oil spill, for instance, resulted in property losses of almost \$1.2 million and recreational value losses over \$3.2 million. Such losses which would be doubled in today's economy must be addressed in the EIS.
- II-7 The beneficial aspect of a platform serving as an artificial reef is of limited value, as sportfishing boats cannot fish within close proximity to a platform.
- II-8 The statement that traffic lanes "...could increase the cost of exploration and development substantially" is misleading and should be deleted. First, the traffic lanes affect only a small percentage of tracts; second, the conclusion is not supported by actual evidence in the Santa Barbara Channel; third, since such lanes are designed to minimize the risk collisions or ramings, their establishment will clearly reduce--not increase costs of petroleum production and transportation.
- This section should also identify the option of deleting tracts should the vessel lanes not be approved prior to the sale as well as providing a vessel lane or tract deletions to Port San Luis which presently serves over 90 petroleum tankers/year.
- II-9,10 The DEIS should revise its conclusions on offshore space-use conflicts. Experience in the Santa Barbara Channel has demonstrated that the location of platforms and the resultant intentional or accidental loss of equipment or debris has rendered former trawl runs unworkable. Since existing rules have not prevented these occurrences, serious consideration should be made in the EIS for deleting tracts within high-yield commercial fishing areas. The major shortcomings in the commercial fishermen's fund should be evaluated in the EIS.
- Since the Santa Maria area is projected to have damages of \$2,475,000 to the commercial fishing industry from an oil spill, some mention of reimbursable costs, legal recourse, and applicability of contingency funds which might cover damages should be included in this discussion.
- Alternatives to the Proposed Action
- II-1,29 It is necessary to reemphasize the need to provide a specific-tract-by-tract evaluation of potential conflicts with OCS oil and gas development to provide a rational basis for tract deletion. Such an evaluation at a level more specific and comprehensive than any herein proposed is specified in detail in our recommendations, and should be included in the Final EIS for this lease sale.
- II-14 "Worst case assumptions used in evaluating onshore air quality impacts placed all sources 3 miles from shore (see section IV. B.)." "The effect (sic) of locating these sources at 6 miles would reduce onshore worst case impacts by ...50%..." This whole argument is invalid because of the U.S.G.S. regulations which allow emission doublings for each additional three miles from shore.
- II-14,15 This section should include a specific evaluation of the projected air pollutant emissions, a calculation of their cumulative and synergistic

PART III - AFFECTED ENVIRONMENT

Geological and Mineral Resources

- effects with existing onshore sources to determine the level of compliance with State and National Clean Air Standards. This evaluation must also identify whether future compliance with Clean Air Standards is possible and suggest such additional mitigation measures necessary to meet these standards.
- II-18,21 The stated primary objective of Alternative #3 is to enhance protection of the California Sea Otter. The DEIS projects a reduction of an oil spill hit in this area from 9-22% (3-30 days) to 9-14.6%. However, the southern extension of the Sea Otter range is Shell Beach. Projected probabilities of an onshore hit to this rocky intertidal area is 11.6-16%. Additional buffering is warranted in this area to further minimize this risk.
- II-22 The following statement is contrary to the findings on LS #35 (as aforementioned) which identified severe impacts to the rocky-intertidal zone! "Although the retention time on steep cliff-like areas is less than that of flat areas, and the impact should be less, not all of this area is steep." This statement also omits the fact that once a rocky-intertidal zone is oiled - it remains oiled until the natural processes break-down the oil.
- II-22,23 The discussion on air quality should also be expanded per our suggestions for Alternative #3.
- II-23 While there may be some air quality benefit due to the elimination of sources that would have been located in the 3-6 mile area, this benefit should be quantified.
- 7-131 The discussion mentions an "additional 3-mile distance to shore," yet this is not part of the alternative. An air quality discussion specific to this alternative is needed.
- II-25 The impacts on commercial fishing would be significantly different from those resulting from holding the sale as proposed. Deletion in this area removes from the proposed sale a number of tracts that have very high-yield fish-catch counts.
- II-25 Not holding the sale would result in removal of a 30 + day supply of crude oil to the entire nations supply. This 30 day supply would hardly result in short or long-term impacts to the nation's energy needs.
- II-28 The discussion on "Delay the Sale" is extremely vague and biased. The delay would not cause certain adverse short-term effects, and once reinstated the effects will not be the same as presently identified due to technological changes, improved regulations and completion of important studies. Throughout the EIS, numerous studies are proposed, but not yet completed. In addition, numerous information gaps exist, many of importance as to make the present analysis of questionable value (see Appendices I & II). An identification of these information gaps, and the benefits derived from the ongoing and proposed studies should be identified in this alternative.
- II-29 The indicated rationale for deleting the Explore but Not Develop Alternative belies reason. Local governmental support for this alternative was elaborated in comments on the Preliminary DEIS. The alternative suggested by local government is not the same as that described as unworkable in the DEIS. For a specific discussion on this alternative see our recommendations.
- III-5,6 The section on petroleum appraisal was obtained from page 34 of the USGS Open File Report #77-593. This section did not include subsequent pertinent information as summarized on page 34, "Many fields in this basin" (Santa Maria) "...have reservoir characteristics that pose difficult economic and technical problems; if similar reservoirs are found offshore, they may prove to be uneconomic to exploit" and on page 35, "Variable oil gravities and extensive tar sands create development problems both from technical and environmental standpoints." A specific discussion on these potential technical environmental problems and a revised economic analysis should be included in the EIS.
- This section should be revised to provide a full assessment of potential hazards as indicated in our recommendations. The entire section is very generalized.
- Specific recommended studies even at a generic level for identified hazards and hazards that warrant consideration for deletion should be identified. Such information is available from the Specific Report by McClellan Engineering for LS #48 which was used in conjunction with site-specific geohazard maps as a basis for County recommendations.
- III-14 The Hosgri fault zone should be mapped and lease sale recommendations specified.
- Physical and Chemical Oceanography
- III-20,24 The credibility of this section would be enhanced by the admission at the onset that little is known about nearshore ocean currents. The discussion and maps of the California current (extending between 372-621 miles offshore) and the Davidson current (extending between 372 and 50 miles offshore) is meaningless (and should be so stated) when attempting to determine the effects of oil spills in the Santa Maria basin which extends a maximum of 27 miles offshore. Additional investigation in this area is needed in order to predict with some reliability the onshore risks of oil spills.
- Reference should be made to the ongoing and proposed oceanographic and meteorological studies as well as the projected benefits that will be derived from this more specific data (i.e. more reliable oil spill risk analysis models).
- III-24,25 The discussion of sea waves and storms is informative but does not address the average conditions along the central/northern California coastline. The Summary of Knowledge indicates 3-9' wave heights occur 70% of the time within the offshore Santa Maria area. This becomes critical in terms of oil spill cleanup (ineffective in waves over 4 feet) and the resultant oil spill risk and must be included in the discussion on oil spills.
- III-30 San Luis Obispo County is not unclassifiable for TSP; the northern portion of the county is non-attainment, and the southern and coastal regions are attainment.

- III-31 OCS air quality regulations are not discussed in Chapter I, rather they are merely mentioned. The need for expanded discussion of the proposed regulations and their likely effect on onshore areas bordering the Santa Maria basin has previously been discussed.

Biological Environment

- III-44 The DEIS should specify whether endemics exist near Point Conception or recommend studies to verify their existence.
- The transitional zone between the Oregonian and Californian biogeographical provinces deserves considerably more attention than one sentence. This is among the most significant biogeographical transition zones in the world. For references see the Santa Barbara Channel Marine Sanctuary Management Information, pp. 11-27 (Corin, Heffermen, et al. prepared for Santa Barbara County and NOAA, 1978).

- III-43,61 The entire Biological Section is vague and generalized lacking the detail necessary to determine the tradeoffs between oil production and environmental risks. Bays and estuaries can be evaluated and prioritized in terms of their importance. Specific species and their ecological and economic importance should be specified within each locale.

- III-50 The DEIS describes the kelp harvesting industry in the region. It does not, however, identify the economic importance of this industry, the availability of the resource, nor any specification as to the location and size of leased kelp-harvesting tracts. This information is readily available from the California Department of Fish and Game.

- III-43,61 The benefits derived upon completion and dissemination of ongoing and proposed studies should be identified. The DEIS merely states such studies are being conducted, no indication is made as to when the results will be made available for public review. Such information should be available prior to the public hearings and include the following: Marine, Mammal and Seabird Survey, Gray Whale migration routes, Risk Assessments to coastal areas, wetlands, and hardbottom, benthic habitats, et al.

- III-48 The specific location of the "hydrocoral" should be identified on a tract basis with proposed mitigation measures.

- III-60 The Peregrine Falcon nesting site on Morro Rock should be identified.

Cultural Environment

- III-65,69 The Coastal Land Use Section is very misleading based in part upon outdated material but more importantly on the land use categories used. The recreation category, for instance, only includes residential and commercial uses within a predominately recreational area. Such a classification precludes the significant park acreage in San Luis Obispo County that is undeveloped yet encompasses over 27% of our coastline with annual visitor usage of close to ten million visitors.

- III-72 Comparison of California's population with the central and northern counties is very misleading since the Bay area is not directly involved with the

lease sale. It would be more appropriate to compare the state population with the County population immediately adjacent to the lease sale area. For the Santa Maria basin this results in the following: 110,020 (coastal planning areas of San Luis Obispo County including the San Luis Obispo planning area) plus approximately 50,000 in north Santa Barbara County (ballpark estimate) for a total of 160,000 people or only .007% of California's population.

III-76

The table on selected economic statistics is also misleading, it should portray the labor market distribution for each county thereby identifying the specific types of labor market increases possible from OCS development. The dollar value added by manufacturing is also meaningless without the dollar added by all sectors of the economy. The following table indicates the major economic sections in San Luis Obispo County portraying the heavy reliance on the tourist trade.

Economic Sector	1979	1978
Agriculture, Mining & Fisheries	10.4%	4.5%
Government	34.5%	29.5%
Trade & Services (retail, wholesale)	39.0%	42.9%
Construction	5.1%	6.9%
Transportation, Communication, Utilities	5.2%	6.5%
Manufacturing		
Financial, Insurance & Real Estate	4.2%	6.2%
	2.5%	3.5%

TOTAL WORK FORCE

- III-86,94 There appears to be a contradiction in the number of expected oil spills within

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the sea otter's range. On page 4-94, the "expected number of occurrences is 0.1 and 0.30..." and on page 4-113, it states "the expected number of spills being 9.3..." However, on page 4-86, discussing the effects on plankton, it is stated that the Santa Cruz area can expect 0.49 spills and the Santa Maria area can expect 1.65 spills. This same figure was used for the Santa Maria area in the Fishery section in mis-calculating potential economic loss to the area from oil spills. Since the effective range of the sea otter includes both the Santa Cruz and Santa Maria areas, it would seem that a conservative number of expected spills would be the sum of those two estimates, or 2.14 spills. Perhaps this is not true, but these estimates obviously need clarification and substantiation.

Commercial Fisheries

- III-88, 110 Much of this information is irrelevant and can be reduced. Important information includes the identification, mapping and evaluation of the following:

- Major commercial fish nursery grounds.
- Mariculture industries (oyster industry in Morro Bay and abalone industry in Cayucos).
- Primary crab and shrimp fisheries.
- Primary bottom fish trawling areas.
- High-yield fish catch areas.

This information is readily available and is a necessity in terms of identifying impacts and developing appropriate mitigation measures. This information is mapped in Appendix III, Maps 2, 3 and 4.

Transportation Systems

III-111, The entire Transportation Section is inadequate consisting of a mere identification of available transportation modes. The EIS should identify their applicability to OCS development - is their adequate railroad, highway and pipeline capacity to service this area? Where and to what level should these facilities be expanded? Does the lack of railroad and highway access foreclose the siting of a major service base? Can existing marine terminals handle or be expanded to accommodate OCS crude oil? In addition, the proposed Santa Barbara land pipeline should be identified and discussed in terms of its feasibility and viability for transporting OCS petroleum from the Santa Maria basin.

III-112 A vessel port access route or the deletion of tracts along historical vessel routes should be established for Port San Luis which services over 90 petroleum tankers per year.

Sportfishing

III-124 While Miller's and Gotshall's study (1965) may be the most extensive published source of sportfishery information, other, more recent, data is be available to the BLM staff. For example, California Department of Fish and Game has been conducting sportfish surveys along the central and northern California coast on a regular basis. A "Coastwide Marine Recreation Survey" began in July, 1979, sponsored by the Pacific Marine Fisheries Commission, is producing data that should be particularly helpful to the BLM staff in making their impact assessments.

Recreation

III-118 Participation figures for state and federal facilities provides only a partial indication of recreational use on the Central Coast. The number and usage of motels, hotels and campground facilities; and the economic sector analysis would provide an additional indication of the extent of tourism and coastal recreation in this area.

Cultural Resources

III-129, Due to space limitations consolidate entire section keeping only pertinent data.

III-137 As of January 1, 1980, 913 sites were officially recorded in San Luis Obispo County. Suggest updating records using a more current source.

Future Environment Without the Proposal

III-148 The conclusion that overall impacts to important marine and coastal habitats will remain the same is another example of the authors attempting to play down the impacts. The conclusion is based on the statement that the expected number of oil spills in this area is only increased by one over the 30 year

life of this project. This section appears to have forgotten the statistically expected 150-223 oil spills identified on page 4-19 and 4-20 which may have a significant impact to coastal habitats. The statement that "the volume of oil tankering will probably increase without the proposed sale," also discounts the additional tankering projected to transport OCS crude metropolitan refineries, as well as the different routes tankers importing oil travel, reducing significantly the probability of an oil spill coming ashore in the subject planning area. This entire section should be rewritten in an objective manner.

III-157 "There would be an increase in foreign and Alaskan tankers carrying crude oil and LNG to the California coast to replace the loss of potential Sale 53 crude oil and gas." The State of California in comments on the 5-year leasing schedule states that regardless of OCS activities there will be an 800,000 barrel oil surplus on the West Coast; therefore, we cannot see increased Alaskan oil coming into California. In addition, foreign crude will probably not be backed out by OCS 53 oil because of the quality of oil (API and sulfur content). Any increased tanker traffic would also not occur along our coast but go directly to San Francisco and/or Los Angeles Harbors.

III-158 "Estero and Morro Bay would expand the marine oil terminal to receive larger tankers." What evidence exists that these terminals will be expanded or is this pure speculation? This statement needs to be justified. If this is being considered these terminals must also be addressed as potential marine terminals for shipping LS #53 oil.

PART IV - ENVIRONMENTAL CONSEQUENCES

For brevity and clarity we suggest Section A (Significant Impact Producing Agents) and Section B (Probable Impacts Resulting from the Proposed Action) be combined in a single section.

Oil Spills

IV-1 This analysis should be qualified by indicating the existing information on winds and currents especially in water depths of less than 600 feet is sketchy and inaccurate. Due to these inaccuracies appropriate mitigation measures such as large buffer zones should be evaluated.

Discussion should note that wind and current patterns off the coast generally serve to move oil spills toward coast. While large spills do not occur often, they can be very large. Improved operational procedures and new technology can reduce substantially the number of spills and size, but risk can never be eliminated.

Using 1,000 bbl's as cutoff for major spills masks significance of situation where 10's of thousands of barrels are spilled as is probably in a well blow out or a tanker collision/grounding.

The spill probabilities are based upon the "risked mean" resource estimates of 402 million barrels of oil in the Santa Maria basin. Since the estimates range from 89-784 million barrels for this basin, it would be appropriate to provide the spill probabilities for the entire range of resource estimates.

IV-2	<p>It is not likely that spill probabilities are proportional to resource estimates, so the EIS is lacking this information.</p> <p>The identified launch sites from which the probabilities of an onshore hit in the Santa Maria basin appear to be based upon a spill emanating from the centers of 5 sub-areas. We recommend that the model also analyze the risk potential of an oil spill reaching shore from a <u>marine terminal site</u>, the more likely area for an oil spill. Sites to be considered should, as a minimum, include the <u>Santa Maria River mouth</u> and the <u>existing terminals at Port San Luis and Estero Bay</u> which could potentially be used for transporting LS #53 crude.</p>		
IV-10	<p>Scenarios 1 and 1A are assumed to be the same in this analysis. Scenario 1, however, includes an OS&T which has a higher probability of an oil spill than an onshore processing and storage facility. This assumption should be corrected.</p>		
IV-3,9	<p>The tables, figures and maps are difficult to read and should be briefly discussed in the text. The <u>resource categories</u> should also be expanded to address <u>key areas, rocks, etc., along our coastline</u>, especially since the Santa Maria basin has the <u>highest potential oil resources</u>. The analysis should include the following: Morro Bay estuary, Diablo Cove (water intake area for the <u>Diablo Canyon Nuclear Power Plant</u>), Pecho and Lion Rock, (sea lion counts - 500, 1,350 respectively) and Southrock and Piedras Blancas Point (sea lion counts 150 and 300 respectively). References provided on request.</p>		
IV-70	<p>The <u>conclusions should be revised in light of the above recommendations</u>. The analysis only provides a portion of the information necessary in analyzing oil spill probabilities and their impact. A comprehensive analysis requires an evaluation of the environmental sensitivity of potential impact areas. Conclusions can then be made as to the relative environmental consequences of siting marine terminals, expanding operations or siting platforms in different locations.</p>		
IV-11	<p>Paragraph #3 suggests tankering LS #53 oil may be safer than tankering the same volume of foreign imports due to the fact that LS #53 oil "...would be transported in American ships with American crews operating under rigid safety and training requirements." This conclusion is unsubstantiated by available evidence and should be revised. First, it does not account for the additional tanker traffic required to move the LS #53 oil (up to five times due to the smaller tanker size); second, it neglects to account for the increased localized risk of tanker movements (LS #53 oil will move along the coast, while imported oil comes to the coast from the west); and finally, it assumes tankers moving LS #53 oil are American and hence safer. This latter assumption may be incorrect in that the smaller tankers transporting LS #53 oil will most likely be older tankers which are less likely to have double hulls or redundant power and navigational controls, and will more likely be subject to mechanical failure.</p>		
IV-19,20	<p>The assumption there is an <u>equal probability of an oil spill between a pipeline and a platform</u> is not justified by studies prepared by the State Office of Planning and Research, and the National Academy of Science. These studies should be used in the model. Additionally, the rationale for</p>		
IV-21	<p>A more specific description of onshore facilities can be found in the New England River Basin Commission study on OCS development and should be included in the EIS. Probable facilities includes: a service base requiring storage, warehouse and dock space; gas and oil partial processing facilities; storage tanks; and pipe-coating and storage yards; a helicopter support base, and other ancillary industries including OCS warehousing, supply stores, catering and laundering services, welding services, marine repair, etc.</p>	<p>The statement "...5 temporarily operational support bases could be constructed ..." should be clarified and corrected. A temporary service base will be required to serve OCS exploration activities, however, such activities may be able to operate from existing facilities at San Francisco and Port Hueneme. Upon discovery of a marketable response, <u>permanent service and supply bases will be required</u>. Depending on the resource potential, extent of activity and the available space, such facilities may require from 2-70 acres of land.</p>	<p>The possibility of siting such a facility near the Santa Maria River mouth is unrealistic and should be deleted from consideration due to the necessary harbor and access improvements. The possibility of using Morro Bay or Port San Luis for such facilities is also unrealistic. Both harbors lack available wharfage and land necessary for loading and unloading operations, offices, access necessary for transporting heavy equipment and supplies; and will result in significant disruptions and dislocations to the present tourist, recreational and commercial fishing activities and facilities in these harbors. Potential options the EIS should consider is the use of Port Hueneme or the proposed Gaviota Supply Base as the major supply base serving the Santa Maria basin with Port San Luis or Morro Bay as a small crew boat base facility.</p>
IV-23	<p>The estimated number of platforms contradicts and underestimates the number specified on pages 1-25-26. These more specific estimates include a low, medium and high resource scenario resulting in 15, 23 and 36 platforms (not the 19 specified on this page). The discussion also lumps all basins together masking significant impacts that should be identified for each area.</p>		
IV-25	<p>Four offshore storage and loading facilities are projected. As aforementioned such facilities should be located onshore to minimize oil spill risk and increased air pollutant emissions.</p>	<p><u>Vessel Traffic</u></p>	<p>This section should also address existing vessel traffic in order to ascertain cumulative impacts. Presently, over 265 petroleum tankers per year service Estero Bay (175) and Port San Luis (90). This Lease Sale for instance would result in a 30% increase in vessel traffic servicing the San Luis Obispo area alone. Such cumulative effects should be addressed.</p>

1V-27	<p>The projected 120 crew boat trips/month for the Santa Maria Basin is grossly understated. The Chevron crew boat facility in Carpinteria, for instance, services a similar number of platforms (12) with 2,200 crew boat trips/month averaged from log sheets during the past year (source: John Herring, Lead Area Foreman, Production Dept., So. California Division, Chevron USA Inc.).</p> <p><u>Effluents and Discharges/Air</u></p> <p>"...if any oil mud is used, the mud would not be released to the ocean...."</p> <p>Is this an OCS order or recommendation?</p> <p>The discussion on formation water should be expanded to discuss the available methods of disposal, their relative advantages, disadvantages, environmental consequences and a recommendation as to the method that minimizes the adverse risk. This discussion should also include the formation water dilution factor and propose appropriate mitigation measures. Such measures could include: reinjection into the well formation, and premixing the formation water to the appropriate dilution factor before disposal into the surrounding waters.</p> <p>Various methods for disposing formation water are identified. The DEIS should specify and require the alternative with the least potential adverse impact to the environment. This specification is necessary in light of the conclusion that "...the lethal and sublethal effect formation water will have on local biota is not known" (p. 2-3).</p> <p>With onshore gas processing (scenario 1A) at Santa Maria, 78% of annual HC emissions in the peak production year will occur onshore. For other scenarios, (without onshore processing) onshore HC is less than 1% for same site and year.</p> <p><u>Changes in Socio-Economic Activities</u></p> <p>A major difficulty with using the Curtis Harris model (CH) at the local level is the resultant aggregate county outputs. A county may experience a relatively minor impact as a whole, but if the effects are concentrated in small localities, the impacts can be substantial. For example, the EIS predicts a maximum population change for the county of 1.0% in 1990 p. 4-124. If this population gain were all to occur in Morro Bay, this would be over a 15% change in population. But it is impossible for CH to determine how the impacts will be distributed within each county. It is also possible that although net county effects are small, there may be large offsetting local effects within the county.</p> <p>We would recommend that intra-county changes be modeled. The reference papers for OCS Sale No. 48 included a model (Richardson Gordon) developed intentionally to fill this gap in the CH model. Both models are described in POCs Reference Paper No. IV (1978) from the Bureau of Land Management. This document declares that the intra-county model "provides information to help local governments to assess the implications of offshore leasing for their own public economies" (p. 183). It concludes that "the dissimilarity of results from the two models is hardly surprising in view of their different structures and objectives" (p. 185). As the above document states: "The model could easily be refashioned to apply to other metropolitan regions" (p. 124).</p>	<p>The CH model does not account for possible external costs imposed upon the fishing and recreation sectors of the economy resulting from drilling activity and oil spills. The input-output model cannot include these effects since the technical co-efficients cannot vary with output. Such external costs must therefore be discussed separately from the CH results, or included within the Richardson Gordon model to assess these effects.</p> <p>Simplistic discussion of changes in socio-economic activity fails to take into account special skills required and the extent of required imported labor, and does not address specific basin unemployment and assess how the lease sale will specifically impact unemployment in each. This section makes generalized statements but lacks specific analysis.</p> <p>"Changes in employment and population may change the existing economic base to a certain extent in some regions." Needs to discuss specific areas or basins and change anticipated.</p> <p>"Additional public and private facilities may need to be planned for in advance of induced demand." Identify examples of such additional burdens this project will place on local agencies.</p> <p>"The extent of impacts would be lessened to the degree that an area has a large and diverse economic base." Needs to discuss specific areas or basins; indicate extent of impact anticipated.</p> <p><u>Development Scenarios</u></p> <p>We continue to urge an evaluation of the feasibility and environmental effects for the use and expansion of existing marine terminal operations in San Luis Obispo. Such an alternative appears to represent the most likely transportation alternative and must, therefore, be analyzed at this time.</p> <p><u>Air & Water Quality Impacts</u></p> <p>Worst case NO₂ levels exceed DOI significance levels onshore for offshore Santa Maria sources.</p> <p>Table IV B.1(a-1) still fails to list "No Project" SO₂ levels for Santa Maria Basin. The "No Data" indication is not correct.</p> <p>Both the future ozone concentration without LS #53 and impact of LS #53 are highly unlikely. The County Air Pollution Control District projects worst case ozone levels of about 12 pphm at that time without OCS. POCs paper 53-5 (AQIA) indicates on page VI-55 a maximum LS #53 ozone increment of 2-3 pphm at shoreline, and an increment with a major accident of 7 pphm. The table should be corrected, and the text revised to reflect these impacts.</p> <p>How can the net increase in Santa Maria area ozone "delay attainment" of the O₃ NAAQS, when we already attain the standard? A more appropriate statement here would be "... could cause the Santa Maria area to become nonattainment for ozone."</p>
1V-52		
1V-55		
1V-58		
1V-64		
1V-65		
1V-71		
1V-72		

The California State O₃ standard is a 1-hour standard, not an 8-hour standard. The final DOE OCS air quality regulations are so different from the proposed regulations discussed here, that air quality impacts must be re-analyzed.

The conclusion states "...acute effects should not be significant." Acute effects are significant and should be treated as such. The lack of data does not justify such sweeping conclusions.

Impacts on Marine & Coastal Ecosystems

The DEIS appears to understate the impacts. Revise these sections for consistency with other OCS study findings (previously noted comments on pp. II 3-5 applies).

"The oilspill model predicts only three shoreline segments... have a hit within 3 days of the spill." Fails to note this includes practically the entire San Luis Obispo and Northern Santa Barbara County coastline.

An inventory of specific marine mammal and seabird breeding, foraging and haul-out areas, major kelp beds and productive rocky intertidal areas should be identified. An evaluation should be conducted of the oil spill probability and proposed mitigation measures including an identification of specific tracts to minimize this probability and the resultant increased human activity in the area.

Even though gray whales have been migrating through the Santa Barbara Channel, an area of high oil seepage, without any apparent ill effects, this does not preclude the possibility of gray whales surviving a massive oil spill without any apparent ill effects.

A severe impact could result from...intrusion on seabird nesting colonies in the breeding season. Avoid leasing tracts in this vicinity.

Important offshore marine mammal and seabird resource areas (Table IV. B2d-3) should be illustrated by geologic basin. Key resource areas along the Santa Maria basin are not identified although the EIS indicates the highest probability of impacts will be within this area. This analysis should also include mitigation measures including the deletion of certain tracts based upon a comparison of oil spill probability and resource area.

"...oil diversion equipment can be available near the entrances of the important bay or river entrances..." Is this realistic? This should be included as a mitigation measure with the identified areas.

Two major estuaries are found within the Santa Maria Basin including the Morro Bay estuary and the Santa Maria River mouth. Both have been designated by the California Department of Fish and Game as two of the top 19 critical wetland areas in California (Acquisition Priorities for Coastal Wetlands in California 1975). The oil spill risk analysis should consider the probability

of a spill from a marine terminal in which likely sites are immediately adjacent to these two estuaries. The discussion should also identify the importance of these areas as a fish nursery, and bird nesting and foraging area.

The Cayucas Abalone Farm and the Morro Bay oyster mariculture industry should be discussed in both biological and economic terms.

The three species of clams mentioned as important to sportsmen are perhaps the lesser of many important species in Morro Bay. There are a minimum of 25 species of fish found in the Bay important to both sport and commercial interests and at least 10 of these have critical life periods dependent on the good health of the Bay. There are also three species of Cancer crab important economically. Neither is there any mention made in this Area Impacts section of the extremely critical beds of eelgrass, *Zostera marina* so important as habitat for many species of fish and invertebrates, forage for thousands of migrating water fowl, and stabilization of mudflats.

Mitigation measures should also be identified to eliminate or reduce any identified impact. One such mitigation is to eliminate the discretion in the biological stipulation (1-60) and make it a mandatory requirement for all leases. Only through such surveys is it possible to identify a special biological resource. Since such surveys are not being conducted prior to the lease sale, they should be mandatory prior to development. Other mitigation measures suggested elsewhere in our comments include the deletion of tracts from leasing, oil spill cleanup equipment in close proximity to significant biological resources (estuaries, etc.) etc.

Conclusions should be rewritten in light of the above comments. Based upon available information it appears the impacts in the Morro Bay estuary and rocky intertidal areas could be severe.

Impacts on Socio-Economic Systems

See comments and recommendations suggested under IV-52,55.

The use of the Curtis Harris model is misleading. The population and number of jobs projected are compared with the overall County population and number of jobs to estimate potential socio-economic changes. The results are distorted because the changes will occur within the coastal areas of San Luis Obispo County and the North Coastal area of Santa Barbara County not within the entire county area. Using the data described under our comments in Section 111-72 projected population changes are .0172%, .031% and .023% for 1985, 1990 and 1995 respectively. These figures are subject to change contingent on the location and distribution of onshore OCS facilities. The projected population change in North Santa Barbara County, assuming a coastal population of 55,000 is over 13%, a significant change.

Based upon the information available, it is not possible to segregate population shifts between San Luis Obispo and Santa Barbara Counties. The assumptions allowing this segregation should be specified.

The analysis of socio-economic effects should also include a fiscal analysis for local government. Conducted at an intra-county level this analysis should identify the projected revenues and expenditures for the various resource estimates and transportation alternatives. This more specific analysis would allow the identification of the fiscal advantages and disadvantages to local government of OCS development and alternative transportation methods.

"...very little in the way of infrastructure stress as a result of the proposed sale." This conclusion is unsubstantiated. The following communities are presently experiencing building moratoriums due to water/sewage deficiencies: Cambria, Morro Bay, and Nipomo. No short-term solution is foreseen in Morro Bay - the proposed service base for OCS development. In addition the following communities have diminished resource capacity (water, supply, sewage capacity) to the extent that the lead time to correct the deficiency is greater than the time estimated to deplete the resource: Cayucos, South Bay (Los Osos, Cuesta-by-the-Sea, Baywood Park), the Five Cities Area (Pismo Beach, Grover City, Arroyo Grande, Shell Beach and Oceano and Nipomo). This reflects a potential water/sewer service problem along almost the entire coastal area of San Luis Obispo County. The two school districts serving these areas, San Luis Coastal Unified and Lucia Mar Unified School Districts in addition are presently at, or approaching capacity.

Another major factor requiring consideration in this section of the DEIS was inferred on p. 2-3: "A significant increase in onshore pollutant concentrations could delay attainment of these standards and risk imposition of stringent federal sanctions as specified in the Clean Air Act Amendments of 1977." Initial estimates by the County Air Pollution Control District (APCD) indicate a high likelihood these standards may be exceeded with OCS development. The EIS should provide a detailed economic evaluation of the resultant onshore air pollution control requirements, the resultant effect of withholding federal funds to the County (highway, sewer, drainage and water project funds), and the possibility of a federally imposed growth moratorium. The estimated economic impact to this County according to the APCD is \$6,000,000.

The gross inaccuracies in the regional socio-economic analysis is best illustrated with the results of a "Cumulative Assessment of Employment and Housing Impacts of the Space Shuttle, MX, LNG and OCS Projects" prepared by the Santa Barbara County-Cities Area, Planning Council, December, 1979. Total direct labor requirements for these projects peak at 4,000-4,500 workers for a 1-1½ year duration. Indirect and induced jobs may equal direct jobs and peak at the same time. Housing impacts will be very significant and short-term rental demand will easily outstrip supply. Assuming that 20% of County motels, 50% of recreational spaces are secured by workers, and commuters from outside the County accounts for 25% of the entire work force, major mitigation funding must be obtained and commitments made by project leaders to forestall a potentially serious problem which will aggravate an already difficult housing situation for many local residents.

1V-98, 123 The conclusions should be revised in light of the above findings and recommendations.
131, 134

Recreation

1V-136,
141

Significant competition and conflict with recreational boating facilities, moorage and activities will occur with the 2,100 service boat trips/month that will use the same port as a service base (see County Comments 1V-27).

1V-141

Reference to closure of a harbor by a boom to prevent oil from entering. An appropriate mitigation measure is the use of an air curtain allowing vessel transit but preventing oil from entering the harbor.

1V-136

The quality of recreational experience will not be increased at the production stage in OCS development as indicated in the last paragraph.

1V-139

Identify all areas being proposed as underwater parks, their specific location, purpose, relation to tracts, probabilities of an oil spill hit and suggested mitigation measures including tract deletions and buffer zones. This is critical in light of the Conclusion on page 4-144, "Water pollutants...could cause serious damage to, or destroy any underwater parks in the area of impact."

1V-144

The EIS should provide an evaluation of the state of the act of oil spill clean-up and recovery technology and its effectiveness in the rough sea conditions typical in this area. Appropriate mitigation measures should be evaluated to offset the ineffectiveness of clean-up and recovery operations including wide buffer zones from environmentally sensitive or biologically important habitats.

Impacts on Commercial Fishing

1V-150

The "...commercial and sport fish toxicity study...should be completed in time to be used in the decision-making process for LS #53." This study is only proposed and has not yet been funded.

1V-150,
152

Although the EIS identifies certain species susceptible to oil, it fails to identify major fish nursery and spawning grounds, high yield fish catch areas, etc. Such information (included in the appendix) is invaluable in determining appropriate tracts to lease.

1V-153

The projected economic loss to the commercial fishing industry as a result of a major oil spill should also include its contribution to the local economy resulting in a total loss of over \$5.9 million dollars.

1V-154,
155

The method used for calculating space use conflict losses grossly understates the true impact. Since fish trawling-runs operate in a linear fashion, the placement of a platform in a strategic location could make the entire run unworkable.

In addition, oil-related debris dropped in the vicinity of platforms has forced the closure of major fishing grounds in the Santa Barbara area. For this reason, prime fishing grounds and high-yield fish catch areas (see maps in Appendix 111) should not be leased for oil development.

The \$72,000 fish net loss is extremely low for the following reasons: 1) assumes only one net is caught on three subsea completion units; 2) assumes only subsea completion units snag nets (primary problem involves oil-related debris that catches in nets); and 3) assumes all losses could be reimbursed by the commercial fishermen's contingency fund--which includes a host of problems: extensive filing requirements, time delays and proof of cause.

Assessment of Space and Use Conflicts...Study" will not be available in time to be included in the EIS for the sale.

The discharge of drilling muds, cuttings formation waters and sewage is anticipated to have a significant impact on...shrimp and spot prawns." An appropriate mitigation measure is to delete leasing in the middle of shrimp beds (as mapped in Appendix 111).

The conclusion of a very low probability of an oil spill reaching the mariculture industries in Morro Bay and Cayucos does not include an evaluation of the increased risk of an oil spill from the additional 120 petroleum tankers/year that may use the existing marine terminals in Estero Bay which are immediately adjacent to the mariculture industries.

A major Onshore Service Base will have a significant, adverse impact to the commercial and sport fishing industry.

Impacts on Shipping/Navigation and Ports

The probabilities of an oil spill entering Port San Luis and Morro Bay should be identified with recommended mitigation measures as suggested elsewhere in these comments. The displacement of containment booms may be unworkable. Port San Luis is a southern facing open harbor which would be difficult to block especially under stormy/windy weather conditions. The Morro Bay harbor channel has an extremely swift current with ocean breakers breaking within the jetty area during the winter/spring months of the year making boom displacement at the harbor mouth highly unlikely.

Increased vessel traffic should be evaluated in terms of present localized vessel traffic.

The EIS should identify the significant effects a major supply base could have to Port San Luis and Morro Bay (see comments IV-21 and recommendations). These effects are not even acknowledged in the EIS.

Conclusion is unsubstantiated (see County Comments).

The text suggests that other uses of the OCS should be subordinated to oil and gas development if we are to avoid unnecessary costs to developing this resource. The text should be revised to reflect the intent of the vessel lanes to make the OCS safe for all legitimate uses--not as a possible hindrance to OCS oil and gas development. Further, the suggestion that

increased costs may result from the necessity to construct two platforms and directionally drill as a result of the establishment of vessel lanes is absurd. Directionally drilling on the OCS is not only common but indispensable regardless of vessel lanes. In addition, the petroleum industry frequently drills wells up to a mile from a drilling platform, satellite wells, and subsea completion units are various methods available that eliminate the need for "two platforms."

Unavoidable Adverse Impacts

An unsubstantiated conclusion is made that the U.S.G.S. regulations will control emissions, but that "some small deterioration in onshore air quality will occur." The extent of this degradation will be "dependent on weather conditions," and since the impact will be "temporary," it is unlikely that it would affect human health." We seriously doubt that the Congress and the EPA would concur with these conclusions given the importance they have placed on not allowing onshore sources to cause such deterioration and degradation of air quality.

Conflicts with commercial fishing activities could be minimized by deleting those tracts from the sale that are located in restricted prawn shrimping grounds, high-priority fish trawl areas, high-yield fish tracts and major fish spawning and nursery areas. These mitigation measures (Appendix III, Maps 2, 3, 4) should be evaluated in the EIS.

The U.S. Coast Guard proposed vessel traffic scheme is one alternative to reduce interference with structures and vessel traffic. Other alternatives deserving attention include the deletion of tracts within heavily traveled areas; the recognition of Port San Luis as a potential conflict (serving 90+ petroleum tankers/year; and a delay in the sale until the U.S. Coast Guard Study is complete.

This entire section is deficient in terms of evaluating the impacts associated with siting a major or minor service base in existing harbors.

Archaeological and Cultural Resources

Coring would result in minimal disturbance to cultural resources as on land, but dredging would result in extensive spatial disturbance.

Visual Resources

The Santa Maria coastline is extensively used by tourists. The Pismo Beach Recreation Area has an annual visitor usage rate of almost four million visitors/year.

Land Use

The conclusions... "population increases are not considered significant and will not cause a strain on services, facilities and housing on a County-wide basis..." is very misleading. Significant effects may occur as aforementioned in prior comments.

- IV-186 As aforementioned, there are significant problems with siting a major service base in Morro Bay or Port San Luis.
- Unavoidable Adverse Impact
- IV-188, 194 This entire section is extremely vague and generalized and should be entirely rewritten to address the aforementioned concerns in detail.
- Gains/Losses
- IV-198 "During the exploration and production phases, there will be very limited interference with the longer-term use of the environment such as commercial fishing and recreation." As our previous comments suggest, this conclusion is incorrect. It appears there may be significant trawl fishing and harbor conflicts which should be clarified in this section.
- Marine Sanctuary Impacts
- IV-200 "The probability of an oil spill hit is 14, 34 and 41 percent for San Miguel Island, Wilson Rock and Richardson Rock respectively." This risk is unacceptable and appropriate mitigation measures such as deletion of tracts should be investigated. These islands and offshore rocks represent some of the most biologically productive in the entire Southern California region.
- IV-200 This section should also discuss, evaluate and suggest mitigation measures for the two state underwater parks proposed in San Luis Obispo County.
- Summary of Impacts
- IV-201 This entire section is inaccurate and should be revised consistent with the aforementioned findings and recommendations.
- No-Sale Alternative
- IV-217 This entire section seriously lacks an objective assessment. Until this section and the following section are revised, the utility of using the DEIS as an informed decision-making aid is not possible. Practically every statement identified below has significant errors in logic rendering the discussion biased and misleading.
- "Cancellation of the Sale" would not result in a loss of oil and gas production. It would only foreclose the present opportunity to search for unproven resources.
- "The alternative should be viewed within the overall context of oil and gas development in the nation." The average oil production from LS #53 represents only .4% of national oil demand. Estimated average production for LS #53 would substitute less than 1% of imported oil.
- IV-218 This entire section is also very misleading and presented in such a manner as to justify the sale. This section should identify the type of information presently lacking (attached Appendix I) the importance of such information in assessing environmental impacts and conflicts, and the necessary time to complete such studies (attached Appendix II). The discussion of environmental studies referenced in Section 1.(B)(4) do not address the issue in this manner.
- Other aspects of "Delay the Sale" referenced in the prior section suffers similar errors in logic outlined above rendering the discussion biased.
- It is hard to imagine how the development of the OCS in light of improved technology, OCS regulations and a more comprehensive environmental data base could result in increased environmental impact. Multiple future uses of the marine and coastal environment will not result in increased environmental impact. It could only result in potential increased conflict. Such increased usage and potential conflict could be minimized by a better understanding of the situation. A key example is the U.S. Coast Guard Vessel Traffic Study which is presently underway to minimize future vessel route conflicts - but will not be completed until after the scheduled lease sale date. A delay in the sale would provide such valuable information to decrease potential conflict.
- "If the sale were reinstated, however, the impacts would occur as indicated in Section IV.B." This will not be the case. As aforementioned, technological
- "Probably the greatest impact from this alternative is the impact and implication it has on DOE's production goal for the Pacific OCS." No Pacific DOE production goal has been established. These goals are expressed in terms of the year of leasing not the region.
- "The No Sale Alternative would result in less sale activity than required by the proposed Five Year OCS Schedule and failure to meet national economic and energy production goals." The 5-Year Plan does not require anything it is simply a schedule of what areas should be studied for future leases." Failure to meet national production goals... "see prior statement.
- "There would also likely be an increase in crude oil imports...if oil and gas were not produced from OCS LS #53." Cancellation of the sale would not increase crude oil imports, it will only maintain the status quo.
- There would be an increased dependence on foreign oil." Again, this alternative does not increase dependence it simply preserves the status quo.
- "It could cause a decrease in employment and income...." This is not possible. The no sale alternative is the present condition it cannot decrease employment and income.
- Delay the Sale

advances, improved OCS operating orders and a better understanding of environmental concerns would tend to reduce the adverse socio-economic and environmental risks in the future.

In summary, this section is seriously deficient and should be entirely rewritten in an objective manner addressing the key points noted above.

APPENDIX I

STATUS REPORT: MAY 1980
BLM ENVIRONMENTAL STUDIES
FOR L.S. 53

ENVIRONMENTAL STUDY	AVAILABLE FOR DEIS	AVAILABLE FOR FEIS	DATE AVAILABLE TO PUBLIC
<u>I. Completed Studies</u>			
Summary of Knowledge of the C. & N. California Coastal and Offshore Areas	Yes	Yes	April 1980
Ecological Characteristics of the N. & C. California Coastal Regions.	Yes	Yes	July/August
Air Quality Impact Study (POCS Ref. Paper # 53-5)	Yes	Yes	April, 1980
Seabird Nesting Survey for C. & N. California (Year I)	No	Yes	July
Summary/Analysis of Available Physical Oceanographic & Meteorological Data	Yes	Yes	mid-May
Formation Water Dispersion Model	No	Yes	Late summer
Oilspill Risk Analysis (POCS Ref. Paper #53-2)	Yes	Yes	April, 1980
Onshore Economic Impact Analysis (POCS Ref. Paper #53-3)	Yes	Yes	April, 1980
Proposed Oil and Gas Transportation Scenarios, (POCS Ref. Paper #53-1)			April, 1980
Recovery of Benthic Marine Populations (POCS Ref. Paper #53-4)	Yes	Yes	April, 1980
<u>II. Studies in Progress</u>			
Marine Mammal & Seabird Survey of N. & C. California (Year II)	No	No	Draft June, 1980
Oceanographic & Meteorologic Study of Offshore California	No	No	
Regional Geohazard Study	No	Yes	Draft, June 1980
Tract by Tract Geohazard Study	No	Yes	
U.S. Coast Guard Vessel Traffic Study	No	No	Summer 1981

APPENDIX II

OFFSHORE OIL DEVELOPMENT: GAPS IN ENVIRONMENTAL DATA

ENVIRONMENTAL STUDY	AVAILABLE FOR DEIS	AVAILABLE FOR FEIS	DATE AVAILABLE TO PUBLIC
<u>III. Funded Studies</u>			
Effects of OCS Activities on Cetaceans - <u>National Study</u>	No	No	
Conflicts of Space & Facilities Use Between the Fishing Industry & OCS Activities - <u>National Study</u>	No	No	Final 12-80
Risk Assessment for Coastal Areas	No	No	
Air Modeling Study (to verify previous data)	No	No	
N. California Recreation & Aesthetics C/B Impact Analysis	No	No	
Seabird Toxicity Study	No	No	
<u>IV. Proposed Studies</u>			
OCS Development & Shellfish Toxicity	No	No	
Acclimation of Marine Mammals Within OCS Lease Areas	No	No	
Evaluation of Fishing Use Conflicts	No	No	
<u>Pinniped Effects Study - National Study</u>	No	No	
Marine Mammal & Seabird Survey (Year III)	No	No	
Marine Cultural Resources	No	No	
Risk Assessment of OCS Development Impacts on Hard Bottom Benthic Habitats for LS 53	No	No	
Oil Toxicity to Indigenous Fish & Shellfish	No	No	
Risk Assessment of OCS Oil & Gas Development Impacts on Wetlands	No	No	
Oil Toxicity to Selected Commercial & Sports Shellfish & Fish Larvae	No	No	
Evaluation of Fishing Use Conflicts (Statewide Study)	No	No	

After reviewing the Preliminary Draft and Final Draft Environmental Impact Statement for Lease Sale 53 (PDEIS 53) and the Final Environmental Impact Statement for Lease Sale 48 (FEIS48), it is evident that much environmental information is lacking. The following are quotes from these documents identifying the need for additional information.

General Coastline Data

- 1) Knowledge of the inter-tidal zone of the Central and Northern California Coast is incomplete with many areas largely unexplored. (DEIS 53, p. 3-43).
- 2) In spite of its importance as a producer of commercial and sport fishes, the Central and Northern California shelf area is among the most poorly studied of the shelf areas of the United States. (PDEIS 53, p. 3-83).
- 3) Endemics are assumed to occur near Point Conception in the transitional zone between the Oregonian and Californian Biogeographical Provinces, but information is sparse on species distribution in this area. (DEIS 53, 3-44).
- 4) Accounts dealing with sandy areas are few. Although Allen (1964) collected 20 species in Northern California, only the male crab was collected every year (1958-1961), the others were absent or in low abundance at least one of the years (DEIS 53, p. 3-45). The distribution of coral beds is not well known in this region; areas around St. Buchanan are known to have coral communities (DEIS 53, p. 3-48). Available studies of kelp in the Central and Northern California region are limited in number particularly in comparison with the voluminous work done in Southern California (DEIS 53, p. 3-49).
- 5) The sub-tidal organisms are not as well known in Central and Northern California as they are in Southern California. Many other studies have been performed..., however, most of these are relatively localized in nature and/or focus on areas close to shore (DEIS #53, p. 3-47).

Water Quality

- 6) Few studies have been made to examine the effects of drilling mud on ocean water quality, (PDEIS 53, p. 4-55), and no investigation has been made on the sublethal effects of drilling muds and cuttings. (PDEIS 53, p. 4-58).

7) No information documents the radium level found in formation water from California Outer Continental Shelf (OCS) oil and gas operations. (PDEIS 53, 4-59).

8) The lethal and sublethal effect formation water will have on local biota is not known (DEIS #53, 2-3).

9) Impacts caused by long-term chronic oil pollution remain uncertain (DEIS #53, 2-5).

Food Chains

10) No one really knows how spilled oil, drilling muds, or trace metal pollutants affect marine food chains or whether environmental alterations due to offshore oil production can preempt or spoil a major feeding area. Long-term food chain experiments are being conducted but results are, so far, inconclusive. (DEIS 53, p. 4-96).

Sea Birds

11) The new dispersants have not really been evaluated in its effects on birds, so the effect is unknown. The effect of the new mitigation and cleanup materials and methods will have to be evaluated when used in the proximity of birds in the future. (PDEIS 53, p. 4-77 to 4-78).

12) Seabird utilization of the coastal rocks, islands and headlands in the winter months of 1979-80 will be surveyed by the U.S. Department of Fisheries and Wildlife (DEIS 53, 3-60). (This study, however, will not be available for the public until after the review period for the Final EIS on LS #53.)

Shellfish

13) Information is needed on the ability of the Pismo Clam to tolerate oil pollution. (DEIS 53, p-90).

Marine Mammals

14) Little is known of the habits of Pinnepeds and nothing is known of the reactions that Cetaceans may have upon encountering floating oil at sea. (PDEIS 53, p. 4-69 and FEIS 48, p. 984).

15) Oil impacts on whales are theoretical. Data does not exist to prove the impacts. Many Cetacean researchers believe whales are potentially very vulnerable to oil spills due to their need to surface to breathe, the location of the blowhole, and the sensitivity of the respiratory tissues and the eyes to oil. (Regents University of California, 1976) (FEIS 48, p. 994).

16) Conclusive evidence is needed as to whether or not increased near-shore activity is driving gray whales further offshore. (FEIS 48, p. 998).

17) There has been no systematic survey for most of the cetacean population of the Central and Northern California waters. A BLM funded contract will systematically survey the marine mammals, Sea Birds in Central and Northern California (DEIS 53, p. 3-51). (However, this report will not be available for public review until after review period for the final EIS on LS #53.)

18) Information on migration routes of whales (excluding gray whales) is very poor; although, they are believed to be well offshore of the gray whales migration route (DEIS #53, 3-52).

19) Cleaning and husbandry techniques for oiled otters are being developed but are not perfected... (DEIS #53, p. 4-94).

20) Physical adverse effects from low frequency sounds on cetaceans are unknown... (DEIS #53, p. 4-94).

Physical Oceanography:

21) Nearshore current data for the Central and Northern California coastline is lacking. Currents in this area are primarily wind driven and the seasonal variability in current patterns is unknown. (DEIS, LS #53 p. 3-24).

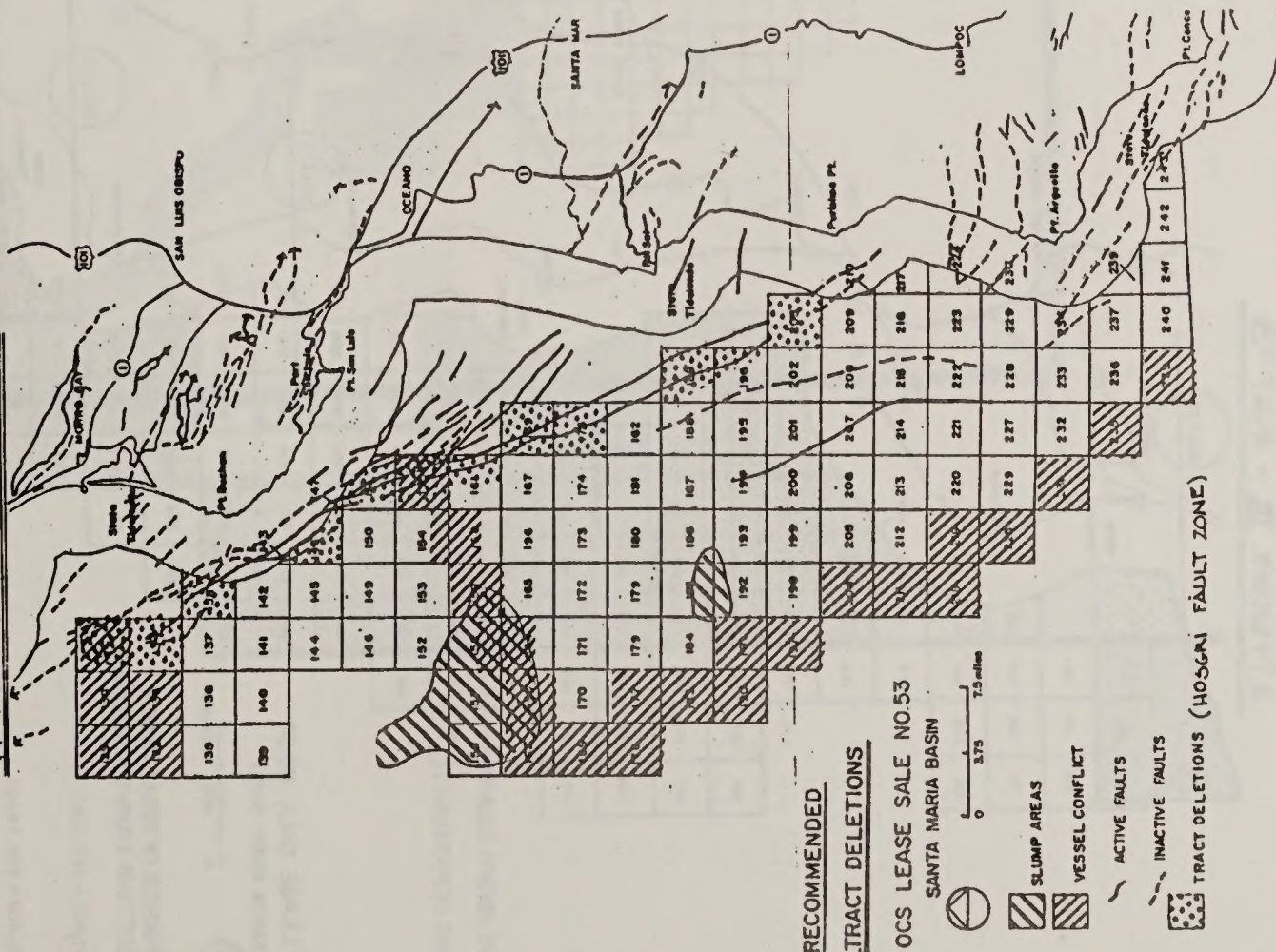
References:

Bureau of Land Management, Preliminary Draft Environmental Impact Statement OCS Lease Sale No. 53, December, 1979.

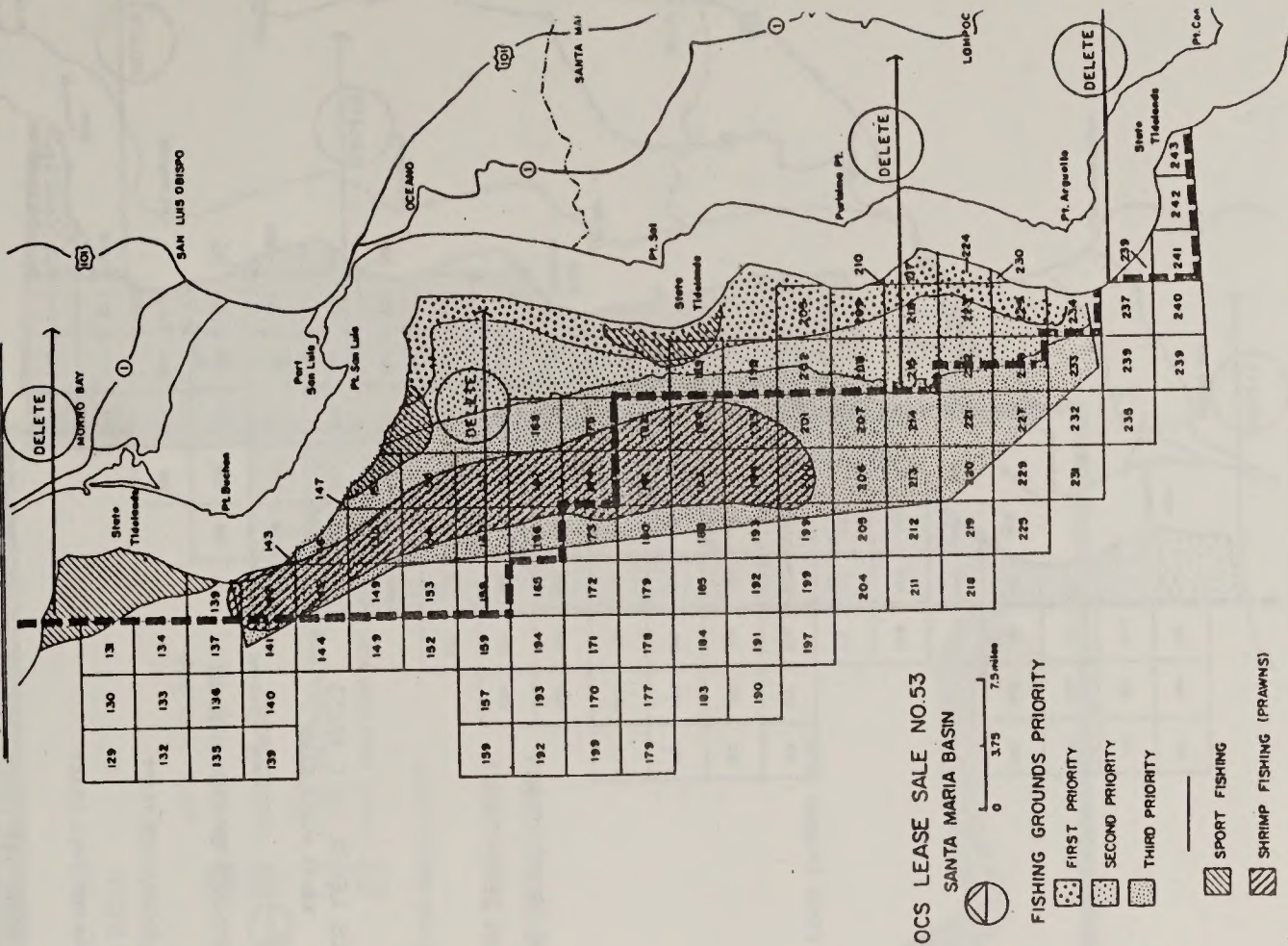
Bureau of Land Management, Final Environmental Impact Statement OCS Sale No. 48, Vol. 2.

Bureau of Land Management, Draft Environmental Impact Statement OCS Lease Sale No. 53, April, 1980.

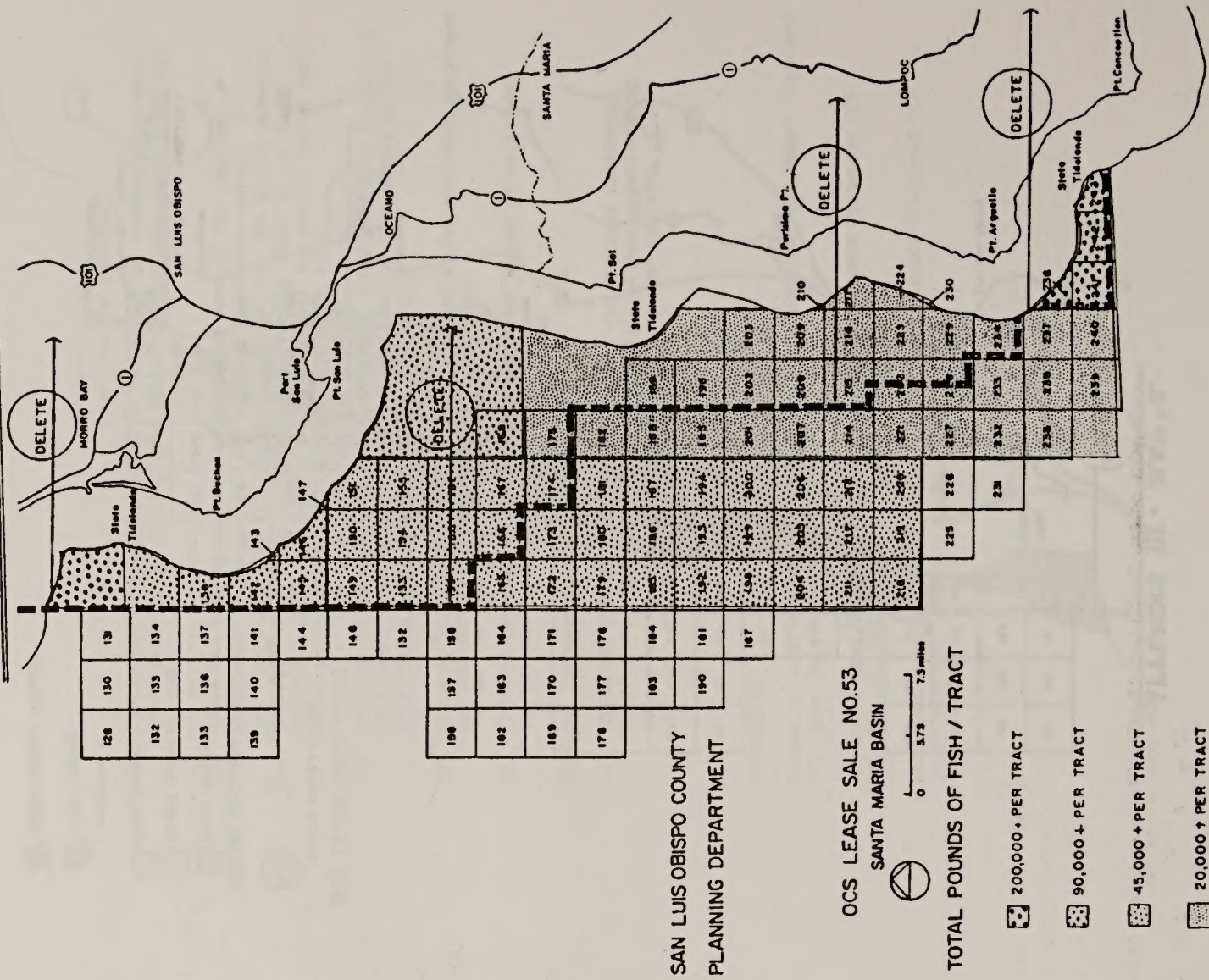
APPENDIX III - MAP #1



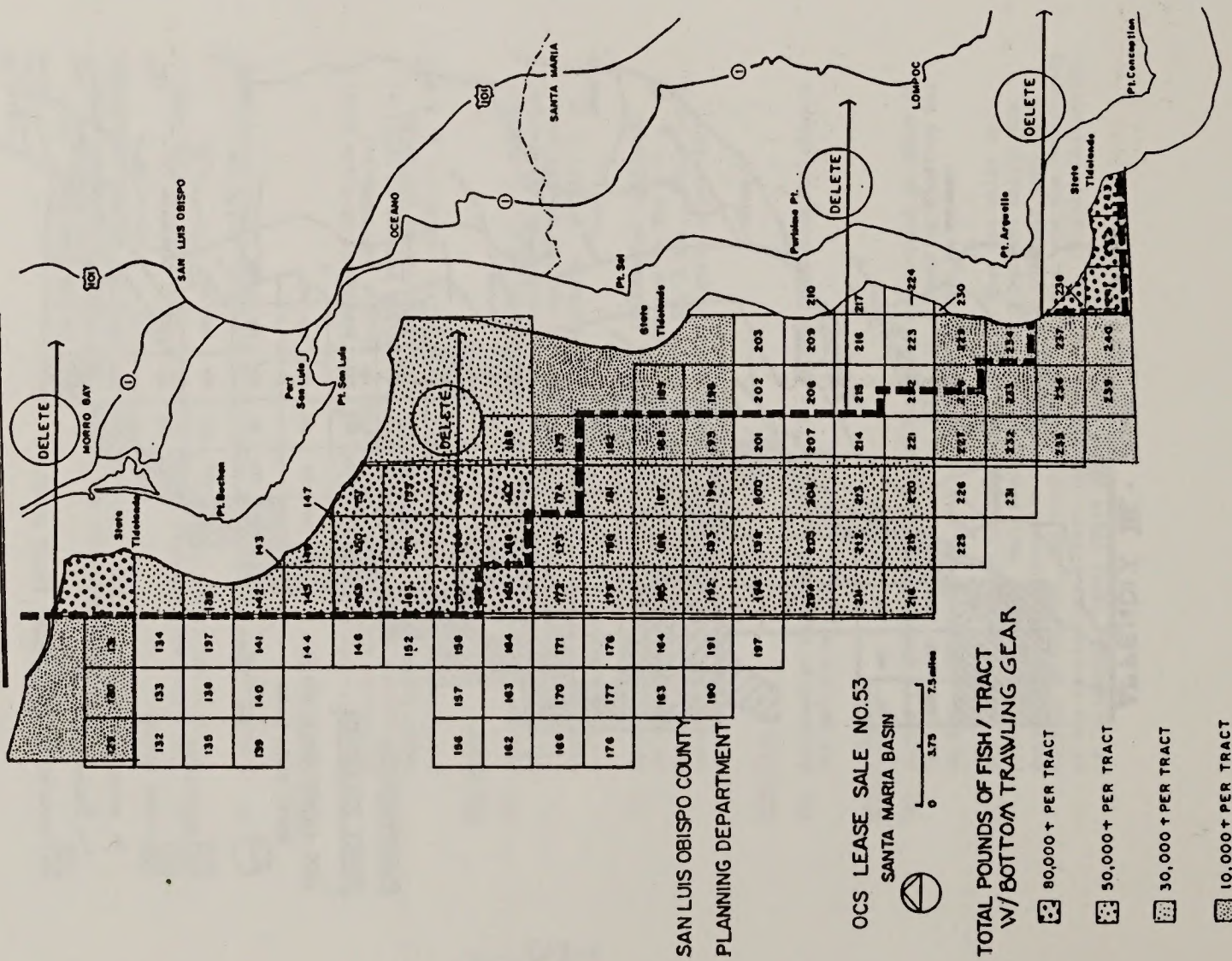
APPENDIX III - MAP #2



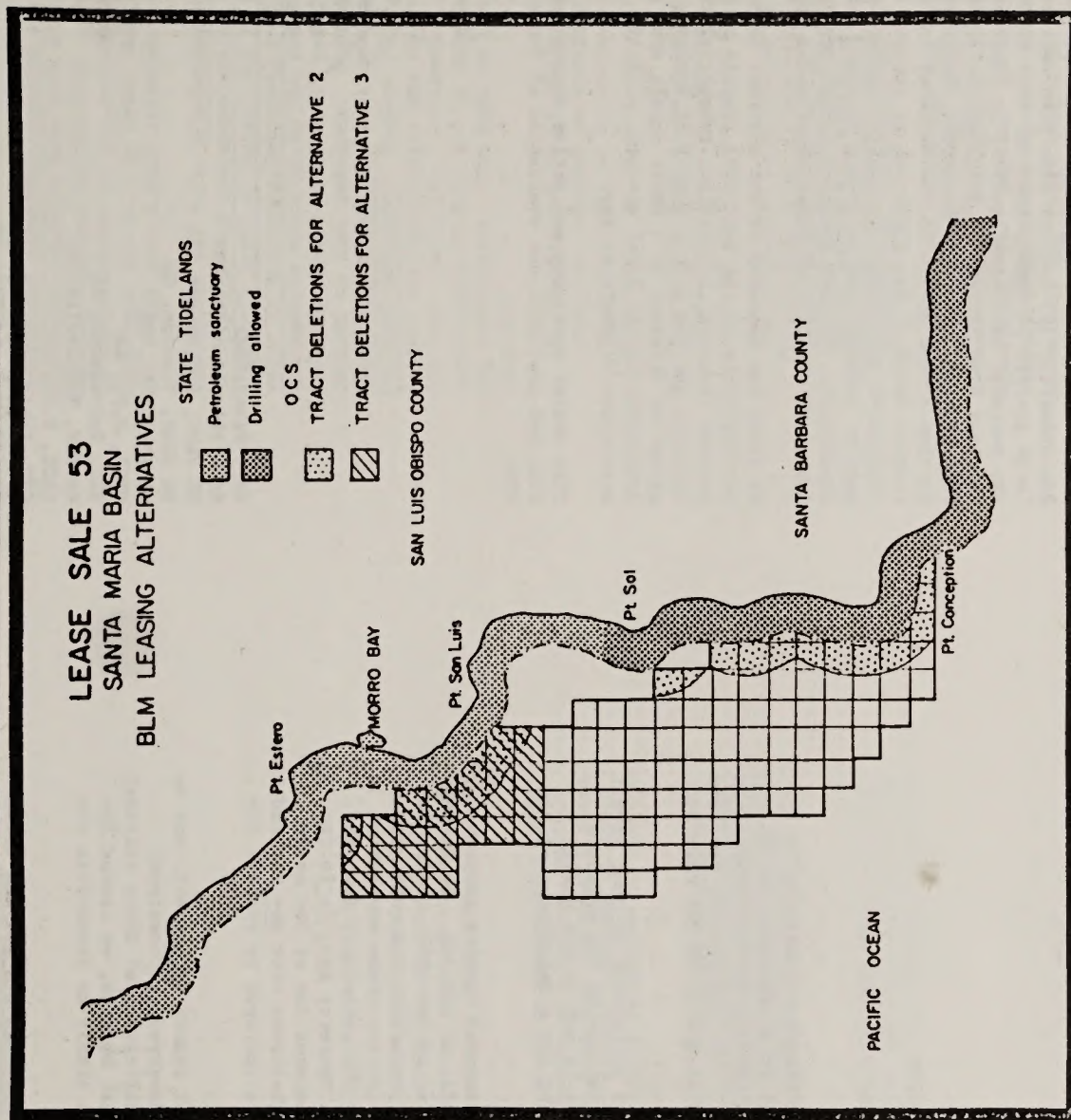
APPENDIX III - MAP #4



APPENDIX III - MAP #3



APPENDIX III - MAP #5





DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT CORPS OF ENGINEERS
211 MAIN STREET
SAN FRANCISCO, CALIFORNIA 94105

SPNCO-RS

No. 11907-27

Mr. Larry Harrison, Project Coordinator
Pacific Gas and Electric Co.
245 Market Street, Room 1060A
San Francisco, CA 94106

11 JUN 1980

Dear Mr. Harrison:

We have completed our evaluation of Pacific Gas and Electric Company's (PG&E's) application to expand its offshore terminal to accommodate up to 90,000 deadweight ton (DWT) oil tankers at the Moss Landing Marine Terminal in Monterey Bay, California (Application No. 11907-27). The application has been processed and evaluated in accordance with our regulations at 33 CFR Part 320 et seq.

After a detailed review and balancing of all factors pertaining to your permit application, I have determined that the proposed expansion of the offshore terminal to accommodate up to 90,000 DWT oil tankers is not in the public interest at this time, and I hereby deny your request for a Department of the Army permit.

The primary reason to deny authorization is the endangered species concern under Section 7 of the Endangered Species Act of 1973, as amended. By letter from the U.S. Fish and Wildlife Service (USFWS) dated 20 May 1980, their biological opinion is that the proposed expansion may jeopardize the continued existence of the Southern sea otter, a threatened species, whose population is "presently in a precarious state." They state that the technology for containment of an oil spill in the open ocean, such as Monterey Bay, is in its infancy and containment may reach at best only 50 percent and as low as 10 percent of the oil spilled. The USFWS, therefore, believes that any adopted oil spill contingency plan at this time cannot be relied upon to protect the sea otter.

The Endangered Species Act requires that any Federal agency action will not be likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of their critical habitat. At this time, based on the USFWS Biological Opinion, we cannot insure that granting the requested permit will not be likely to jeopardize the continued existence of the sea otter.

Another reason for denying the permit is that the proposed project has stimulated considerable public opposition concerning its merits. Public opposition underscores the uncertainties of this project. In weighing the relative extent of the public and private needs, we have found the public benefits of the

SPNCO-RS

No. 11907-27

proposed expansion to be limited, even with the recognition that PG&E's Moss Landing power plant is a public utility. Cost savings of transporting fuel oil might be passed on to PG&E's customers, but such savings appear nominal. The "public" that lives and makes its livelihood in the Monterey Bay area has voiced considerable objection to the proposed expanded offshore terminal. Approximately 125 letters have been received by the Corps (many representing large groups) in opposition, and over 10,000 signatures of citizens protesting the proposal have been received by Congressman Leon Panetta. The Corps has received nine letters in favor of the proposal, including one group and the Moss Landing Chamber of Commerce. Congressman Panetta, who represents a large portion of the public in the Monterey Bay area, has requested the Corps (letter dated 29 May 1980) not to approve the permit application because of inadequate guarantees of resource protection, the continuing availability of smaller tankers, the existence of other fuel supplies, and significant local opposition. We have received formal resolutions from the city of Pacific Grove and the city of Carmel-by-the-Sea opposing the project.

We share the concerns of the citizens of the Monterey Bay area regarding the uncertainties of the potential impacts of the proposed project to their economy (tourism, recreation, commercial fishing, and aquaculture), endangered species, and the unique beauty of Monterey Bay. The public benefit to be gained by issuance of a Corps permit does not appear to outweigh the possible detriments to the local economy, wildlife, wetlands, recreation, and the aesthetics of Monterey Bay.

This denial concludes our action on your permit application. This decision will not prejudice our evaluation of future Corps permit applications from PG&E.

Sincerely,

John M. ADSIT
JOHN M. ADSIT
Colonel, CE
District Engineer

Copy Furnished:
Honorable Leon Panetta
US F&WS, Sacramento, CA
US NOAA, Tiburon, CA
US EPA, S.F., CA
USCG, S.F., CA
SRA, Sacramento, CA
CA F&G, Yountville, CA
CACC, S.F., CA
CZC, Santa Cruz, CA
Sierra Club, Carmel, CA
FOG, Pacific Grove, CA



ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS
MAIL ADDRESS P.O. BOX 190, MONTEREY, CALIFORNIA 93940 • TELEPHONE (408) 624-2117
OFFICE LOCATION 23845 HOLMAN HIGHWAY, SUITE 227

July 2, 1980

Mr. Bill Grant
POCS Office-BLM
1340 W. Sixth Street Room 200
Los Angeles, CA 90017

Dear Mr. Grant:

As part of AMBAG's participation in the leasing process for Sale 53, the following comments have been prepared on the Draft Environmental Impact Statement. Please note that we have previously submitted detailed comments on the Preliminary Draft Environmental Statement, and on the three models used in the environmental assessment. Some of the concerns previously expressed have been repeated here as they still have not been responded to.

In addition to the general and page-specific comments prepared by AMBAG staff, more detailed analysis of potential impacts on plankton, lentic organisms, and kelp beds and geologic hazards have been included. These comments were prepared with the assistance of several graduate students from Moss Landing Marine Lab, and contain valuable references to relevant data which has been omitted from the Draft EIS.

I hope that the information presented here will contribute towards a Final Environmental Impact Statement that is more complete and accurate than the Draft. I realize that you have many comments to respond to, but at the very least, please consider inclusion of the factual data included here. The document will be strengthened if some of the outstanding information gaps can be filled.

Please do not hesitate to call if you or members of your staff need our assistance. It is of utmost concern to us that the Final EIS accurately reflects the possible impacts which could accrue from proposed Lease Sale 53.

Sincerely yours,

Julie Brandlin

Julie Brandlin
Regional Planner

JB:vbd

Enc.

GENERAL COMMENTS

1. Previously submitted comments are not reflected in the DEIS. None of our major concerns have been addressed despite the submittal of extensive comments on the PDES. The time and resources we have invested in contributions to the environmental assessment thus far appear to have been futile. In order that they may be considered in preparing the Final EIS, I will reiterate some of our comments on the PDES.
 2. Throughout the DEIS, a considerable number of pages are dedicated to descriptions of resources which, although entirely accurate, are at such a general level of detail and so descriptive in nature as to have minimal value in assessing potential environmental impacts. There is very little information specific to the Monterey Bay. Information presented for each resource should be directly pertinent to OCS development and possible impacts on that resource. Scientific names of species (such as in Commercial Fisheries, Section III), historical data (for example, under Cultural Resources, section III) and other information of limited relevance are unnecessary and take up valuable space with respect to the 300 page limitation. References should be more widely used, both to save unnecessary details and to establish the legitimacy of the information and conclusions. The type of information that would be of greater value includes:
 - a. An identification of the present value of each potentially affected resource, whether in monetary terms (if dollar values can legitimately be determined) or by estimating the less tangible value in terms of aesthetics or the quality of life.
 - b. Characteristics of each resource which make it vulnerable to OCS development-related impacts. Outputs of the models should not be used to justify exclusion of resources from consideration.
 - c. The potential consequences of impacts from OCS oil and gas development (including large oil spills) should be identified where known. Where results of OCS impacts are not known, this information deficiency should be clearly indicated. To dismiss possible impacts as "insignificant" or "minor" can not be justified on the basis of lack of information, as appears to be the case in the discussion of plankton.The assumptions throughout the PDES used to analyze potential impacts and reach conclusions should be made explicit. It is difficult to distinguish between factual information and estimates which have been generated to fill data gaps. The "unknown" parameters should be identified as such, and the rationale behind assumptions provided. This pertains to both the models as well as all other impact analyses.
- For example, if the impact of an oil spill on the approximately 400 species of red algae living in the coastal waters of Northern and Central California can not be analyzed due to lack of information, this should be made clear rather than ignored.
4. With respect to the models (Oil Spill Risk Analysis, Curtis Harris Economic and Air Quality), model results should be preceded by a clear explanation of the basic assumptions, uncertainties and confidence levels associated

with each. The results of the models must be put in the perspective of the structure of the models, assumptions and quality of input data. For example, the impact data for the oil spill model consists of onshore wind data from 5 locations, only 3 of which are in the lease sale area, and estimates of current movements. It is readily admitted in the DEIS that data is lacking. Yet the results of model are used as a basis for all subsequent evaluations of impact on specific resources. When the oil spill model does not indicate impact by spilled oil, that particular resource is assumed to not be threatened. Complete reliance has been placed on the model, which instead should be viewed as a tool. The model results are not an end in themselves.

Too much emphasis has been placed on the models with too little reference to their inherent shortcomings. Policymakers are likely to accept model outputs as fact without questioning the methodologies or input which determine these projections. In this sense, the PDES would be more valid without the models, as it is more desirable to have an incomplete analysis than one which grossly underestimates the potential impact.

5. An essential part of the PDES should be the identification of study needs which arise in the attempt to analyze possible impacts. Documentation of data gaps would be valuable in designing future environmental study programs.

6. Chronic, low-level oil spills should be included with all lists of "activities with adverse impacts on organisms".

7. Effects on entire ecosystems and food chains are not considered. Impacts on one species or resource will most likely have repercussions on dependent organisms. For example, if benthic organisms, plankton and other marine organisms near platforms absorb toxic elements from discharged materials such as drilling cuttings and muds and formation water and become food for higher life forms, the consequences could be significant. Impacts could extend beyond the immediate area of the discharges. This is especially significant in view of the varied chemical constituencies of platform effluent and lack of data on long-term impacts.

8. The basin-specific data needed to assess impact on particular areas or resources is lacking. Information is presented at such a general level that, for the main part, this document could be used for any lease sale in the country. It does little to contribute towards an understanding of the specific impact of lease sale 53 on central and northern California.

9. Cumulative impacts are never considered although the word "cumulative" frequently appears. The analysis is broken down into resource categories. For each category, there are many citations of potential adverse impacts, and many more "unknowns". But you fail to go one step further to demonstrate that the composite of all those specific conflicts, when considered with the data gaps, is potentially a very large impact. The individual impacts are never summarized.

10. Throughout the DEIS, lack of data seems to be equated with lack of impact potential.

11. The authors are blatantly biased. Considerable pages are used in justifying the proposed sale from a national energy perspective, and the alternatives are obviously incomplete and not seriously intended for consideration. This is not appropriate use of an EIS.

12. There still remains an overall lack of consistency throughout the document. Most significantly, while in one section, serious potential impacts are listed, the overall conclusions are of minimal impact.

13. There seems to be an overwhelming absence of logic. Conclusions do not follow from the data presented, and contradictions are found within the same page.

14. Information on marine ecosystems is inadequate and incomplete with respect to marine ecological communities, the descriptions and impact models include discussions on a great number of very different areas, and hence there is very little specific information that can be used to predict impacts on individual communities.

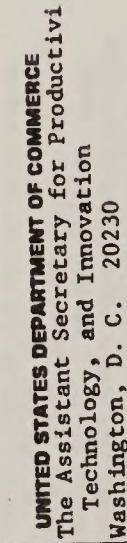
The Monterey Bay is a highly diverse, productive area which has been studied in depth by the four research institutions located in Santa Cruz and Monterey counties. Scientists have extensively studied many kelp forest, sandy bottom, intertidal, and onshore habitats in this area, information which is relevant to the lease sale and yet not included in the DEIS.

Instead the DEIS often references studies conducted in Southern California and centers discussion on very general ecological communities. This may not be wholly accurate, since even though many of the organisms are similar, many of the physical and biological processes which influence these communities are very different.

A case in point is the frequent reference to Southern California kelp forests. Foster, et al. (1979, 1979b) In studying the kelp forests between Point Santa Cruz and Ano Nuevo Island found that Central California kelp forests have more dynamic seasonal fluctuations due to increased impact of winter storms. The large swells generated by these storms cause highly seasonal fluctuations in canopy cover, which consequently greatly influences forests. This is in contrast to the comparatively more stable Macrocystis forests in Southern California.

Many other studies have been conducted in our area that point out the richness and diversity of the offshore area, and should be covered in more detail. The lack of specific information on the Monterey Bay is not due to insufficient information on this area, but rather a superficial consideration of existing data. (See for example reports by Foster, et al., 1979, 1979b).

Another problem which makes it difficult to assess impacts in specific areas is the lack of scientific names. Terms such as "crablike" or the use of generic names without the specific names makes comparisons and assessments difficult.

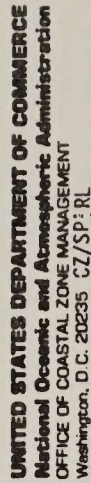


United States Department of the Interior
Bureau of Land Management
Pacific Outer Continental Shelf Office
1340 W. Sixth Street, Room 200
Los Angeles, California 90017

This is in reference to your environmental impact statement entitled "Central and Northern California Lease Sale No. 53." The enclosed comments from the National Oceanic and Atmospheric Administration and from the Maritime Administration are forwarded for your consideration.

Bruce R. Barrett

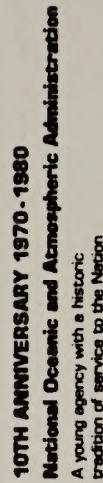
Mr. Kenneth W. Forbes
Office of Shipbuilding Costs
Maritime Administration



JUL 2 1980

• one established estuarine sanctuary, Elkhorn Slough, that, though situated in the state waters within Monterey Bay, could still be affected by oil and gas development.

Information is provided herein on the status, recommended boundaries, and identified resources, for all these sites. I recommend that this information be used in the preparation of the FEIS to provide a more complete picture of the marine and estuarine sanctuary programs and to serve as a basis for a fuller analysis by BLM on leasing options and procedures with regard to the valuable natural resources in these areas. Particular attention should be given to the analysis of the consequences of potential Lease Sale 53 hydrocarbon development on the proposed Point Reyes-Farallon Islands and Channel Islands sanctuaries because of the imminence of their designation.



MARINE SANCTUARY ACTIVE CANDIDATES

Point Reyes-Farallon Islands Proposed Marine Sanctuary

The DEIS for the proposed sanctuary was distributed in March 1980. Public hearings were held in May 1980. The FEIS is presently being prepared and is scheduled for release in the summer of 1980. It is anticipated that sanctuary designation will occur before the end of this calendar year.

As proposed, the sanctuary would extend shoreward to the mean high tide line or the seaward boundary of the Point Reyes National Seashore. Between Bodega Head and Point Reyes Headlands the sanctuary extends seaward to 3 nautical miles (nmi) (5.6 kilometers (km)) beyond territorial waters. The proposed sanctuary also includes the waters within 12 nmi (22.2 km) of Noonday Rock and the mean high tide line on the Farallon Islands, and the waters between the Islands and the mainland from Point Reyes Headlands to Rocky Point (just southeast of Bolinas Lagoon). The proposed sanctuary includes Bodega Bay, but not Bodega Harbor. Figure 1 shows the proposed boundary and approximate location of tracts in the area.

The waters of the proposed sanctuary contain marine and intertidal habitats for a significant and diverse array of marine mammals and marine birds, as well as other living marine resources. Marine birds and mammals, present in vast numbers on the Farallon Islands and the mainland coast, depend as much on the integrity and productivity of these adjacent ocean and estuarine waters as on the preservation of the shore areas they use for breeding, resting, and hauling out. Detailed information can be found in the DEIS (enclosed).

The regulations proposed for the sanctuary would prohibit all hydrocarbon exploration and development activities anywhere within the sanctuary. Tracts 069 and 073 in the northwestern corner of the Santa Cruz offshore area north of Monterey Bay lie partially within the proposed sanctuary boundaries. Any development of the oil and gas resources beneath those restricted portions of the tracts would have to be conducted through directional drilling techniques from outside the sanctuary. We request that DOI advise the lessees in the notice of sale that oil and gas activities will be prohibited within the boundaries of the sanctuary. Additionally, if DOI determines that it will not be feasible to recover the oil and gas resources from portions of tracts that fall within the sanctuary boundaries through directional drilling techniques, we recommend that those tracts be deleted from the sale.

The proposed regulations will also limit pipeline placement and the passage of certain vessels, including freighters, tankers, barges, and OCS supply vessels within specified distances of the Farallon Islands, Noonday Rock, Bolinas Lagoon, and Areas of Special Biological Significance

designated by the State of California. The placement of pipelines will be prohibited within 2 nmi of these sites and vessel navigation and operation within 1 nmi. However, based on the comments received on the DEIS, OCSM is evaluating the benefits of extending the latter buffer zone to 2nm. The regulations also provide for sanctuary certification of all permits for pipeline placement in the remainder of the sanctuary. This office is aware that BLM at this time does not contemplate the use of pipelines to transport oil and gas found as a result of this lease sale due to the geological instability of this region. Proposed final sanctuary regulations will appear in the FEIS.

The currently proposed sanctuary regulations do not address vessel traffic elsewhere in the proposed sanctuary. However, several comments were received in response to the DEIS recommending that petroleum transport be prohibited in the entire sanctuary. This office is concerned about the risk of a tanker or barge accident in the Gulf of the Farallones. The health of bird and marine mammal populations breeding and foraging in the proposed sanctuary could be seriously harmed by an oil spill. It is recommended that BLM analyze in the FEIS the environmental and economic impacts of a prohibition of petroleum transport travel through the Gulf of the Farallones and discuss the additional environmental safeguards in vessel design standards that could be applied to tanker traffic if the 1978 protocols to the 1973 Convention for the Prevention of Pollution from Ships (MARPOL) and to the 1974 Convention on the Safety of Life at Sea (SOLAS) come into force.

The Sanctuary Programs Office plans to work through the Regional Response Team and/or the Bureau of Land Management to develop special oil spill contingency plans for the estuaries in the proposed sanctuary. As discussed in the DEIS, these wetlands are vital habitat areas in the life cycles of many species of birds and fish and are very vulnerable to damage from oil.

Monterey Bay Proposed Marine Sanctuary

A schedule for the designation process will be developed in fall 1980. Firm boundary alternatives have not yet been developed. The Monterey Bay marine sanctuary study area stretches approximately 127 mile (237km) along the central California coast from just north of Point Ano Nuevo south to Point Piedras Blancas. The entire coastline of Santa Cruz and Monterey Counties is included, as well as small portions of San Mateo and San Luis Obispo Counties. The shoreward boundary of the area is the mean high tide line, except at the mouth of Elkhorn Slough near Moss Landing, where the Moss Landing Harbor District's jurisdictional limit is utilized. There is no fixed seaward edge to the study area, although ocean space out to roughly 20 nm (37 km) beyond territorial waters will be considered for resource and human activity survey purposes. Figure 2 shows the sanctuary study area.

The major types of marine resources in the study area that provide a basis for sanctuary designation are marine mammals, seabirds, fish and shellfish, marine flora, and benthic fauna and intertidal organisms. Marine mammals include at least five species of seals and sea lions, 15 species of whales and dolphins, and the California sea otter, which is listed as a threatened species by the U.S. Fish and Wildlife Service because of the population's vulnerability to oil pollution. Sizable assemblages of Brandt's cormorant and the common murre and several other species nest in the region.

Dozens of other species, including brown pelicans, gulls, shearwaters, loons, terns, puffins and phalaropes, also concentrate in the area. A broad range of commercial and recreational fish resources is found in the nearshore and off-shore areas. Most of the coastline in the region is fringed by kelp beds, which are not only harvested commercially, but also serve as habitats for a variety of fish species including lingcod, cabezon, jack mackerel, salmon, bonito, and rockfish. Rich benthic communities abound throughout.

Regulations for the sanctuary have not been developed at this time. Proposed regulations will be included in the DEIS. Since the resources here are similar to those found in the other active California sites, activities subject to regulation may also be similar.

Channel Islands Proposed Marine Sanctuary

While this active candidate is not situated within the central and northern California OCS region, the BLM DEIS notes that oil and gas development in the tracts located in the Santa Maria Basin could affect the proposed sanctuary, especially San Miguel Island, Wilson Rock, and Richardson Rock.

The DEIS for the proposed northern Channel Islands and Santa Barbara Island sanctuary was distributed in November 1979. Public hearings were held in January 1980. The final environmental impact statement (FEIS) was released in March 1980. Designation of the Sanctuary may occur as early as fall 1980.

As proposed, the sanctuary would extend 6 nmi (11.1 km) seaward from the mean high water mark of the following islands and offshore rocks: San Miguel Island, Santa Cruz Island, Santa Rosa Island, Anacapa Island, Santa Barbara Island, Richardson Rock, and Castle Rock.

These islands support a large and diverse community of marine mammals. San Miguel Island is unique in that it is the only island in the world on which six species of pinnipeds haul out. There are some 32 species of marine mammals in the area including the northern elephant seal, California sea lion, harbor seal, northern fur seal, dolphins, porpoises, and minke, gray and pilot whales. In addition, the area serves as habitat for breeding seabirds. Major rookeries are found on San Miguel and Santa Barbara Islands and offshore rocks and the nearshore waters of all the islands are heavily used for foraging. The site also contains highly productive kelp beds, commercially and recreationally valuable fish and shellfish, and several transition zone species. Detailed information can be found in the enclosed FEIS.

The proposed sanctuary regulations for hydrocarbon operations allow exploration and development with additional protective equipment on tracts leased before the effective date of the regulations. Such activities on tracts leased after the effective date would be prohibited. The proposed regulations are designed to protect the sensitive living resources of the area from threats resulting from oil and gas activities by keeping

such activities at a minimum within the sanctuary and by requiring protective oil spill containment measures when drilling and other operations proceed.

Sites on the List of Recommended Areas

The material presented on the LRA sites has been compiled primarily from the original sanctuary nominations as submitted to the Sanctuary Programs Office. The proposed boundaries and other site information, such as the identification of the valuable resources warranting protection, were furnished by the recommending individual or organization. Information is being collected by this office to assist in the further evaluation of the recommended sites. The following elements will be considered in the determination of the boundaries of any site evaluated for sanctuary status:

- range and interrelations of key elements of the ecosystem,
- potential for adverse impacts from human activities at some distance from where they are conducted,
- effects of displacing human activities to other locations, and
- feasibility and cost of conducting surveillance and enforcement activities in the area.

A site must be on the LRA for it to be considered further for sanctuary status. Sites on the LRA may be selected as Active Candidates according to additional selection criteria and available program resources. Neither placement of a site on the LRA nor selection as an Active Candidate, establishes any regulatory controls. This can only occur after the designation of a marine sanctuary in accordance with regulations. Listing is a prerequisite for designation as a marine sanctuary, but it does not imply that designation will occur. Among the factors that are considered in naming Active Candidates from the LRA are the significance of the proposed sanctuary resources, the severity and imminence of existing or potential threats to these resources, and the ability of existing regulatory mechanisms to protect the values of the site.

Information on resources and boundaries as submitted by the recommender follows:

North Coast Rookeries (CA)

The site is a series of offshore rocks and islands clustered along the extreme northern California coast from the Oregon border south to Mussel Rock in Del Norte County (see Figure 3).

This remote area of the California coast provides a great variety of essential habitats to birds migrating along the Pacific flyway, a large number of molluscan species, many anadromous fish, three species of seals and sea lions and numerous rocky intertidal plants and animals. Prince Island, Hunter Rock, White Rock, Cove Rock and Castle Rock provide nesting sites for five species of seabirds, and roosting areas for many species

including the Aleutian Canada Goose. Several other seabird species feed in the surrounding waters and along the beaches. On shore, the Lake Earl/Smith River Delta area is a key coastal wetland situated in northern California. The Lake and Delta have retained much of their value to wildlife and serve as an important link in a chain of such wetlands that extend southward along the Pacific Ocean from Alaska to South America. Millions of water-associated birds of the Pacific flyway utilize these areas as feeding and resting stops along their migration paths. In California, these wetlands also serve as a significant portion of the available wintering grounds for a major share of the birds within the flyway. During the summer months the brown pelican can be seen in the lower estuary and along the beaches. Other breeding seabirds in the area include the pelagic cormorant, Black oystercatcher, western gull, and pigeon guillemot. The Smith River is also one of the state's most productive salmon and steelhead streams. The Smith River and its tributaries provide spawning and nursery area for anadromous and resident fishes. The delta estuary plays an important role in the life cycle of other fish such as the coastal cutthroat, green sturgeon, candlefish, shad and other marine and anadromous species. The scenic qualities and abundance of fish and wildlife attract many outdoor recreationists to this coastal region and offer outstanding opportunities for hunting, fishing, nature study, photography, camping and sight-seeing, as well as for scientific and educational use.

Mendocino Offshore (CA)

This recommended sanctuary lies offshore from the scenic Mendocino County coastline and includes the water from Laguna Point to Gunderson Rock (see Figure 4).

The area's coastal streams, rivers, ponds, and creeks provide salt water marshes, mudflats, and riparian habitats that support many forms of wildlife. Extending offshore is a spectacular geologic feature, the Mendocino Staircase. It consists of three to five marine terraces in fifteen giant staircases. These staircases provide one of the longest continuous records of ecological succession in the world. Offshore biological communities found in association with these terraces include kelp beds, major anadromous fish streams, wetlands, rocky intertidal habitats, and bird rookeries. The many anadromous fish streams support populations of steelhead and silver salmon. Important bird species found in the area include the pelagic cormorant, Brandt's cormorant, and black oystercatcher.

ESTUARINE SANCTUARY PROGRAM

Elkhorn Slough Estuarine Sanctuary

Elkhorn Slough is located on Monterey Bay, roughly at the midpoint between the cities of Santa Cruz and Monterey. It opens into the bay's Monterey Submarine Canyon at Moss Landing. The slough curves east and north for approximately seven miles, draining the hilly uplands and cultivated marine terraces that lie between the Pajaro and Salinas Valleys. The watershed of Elkhorn Slough proper, east

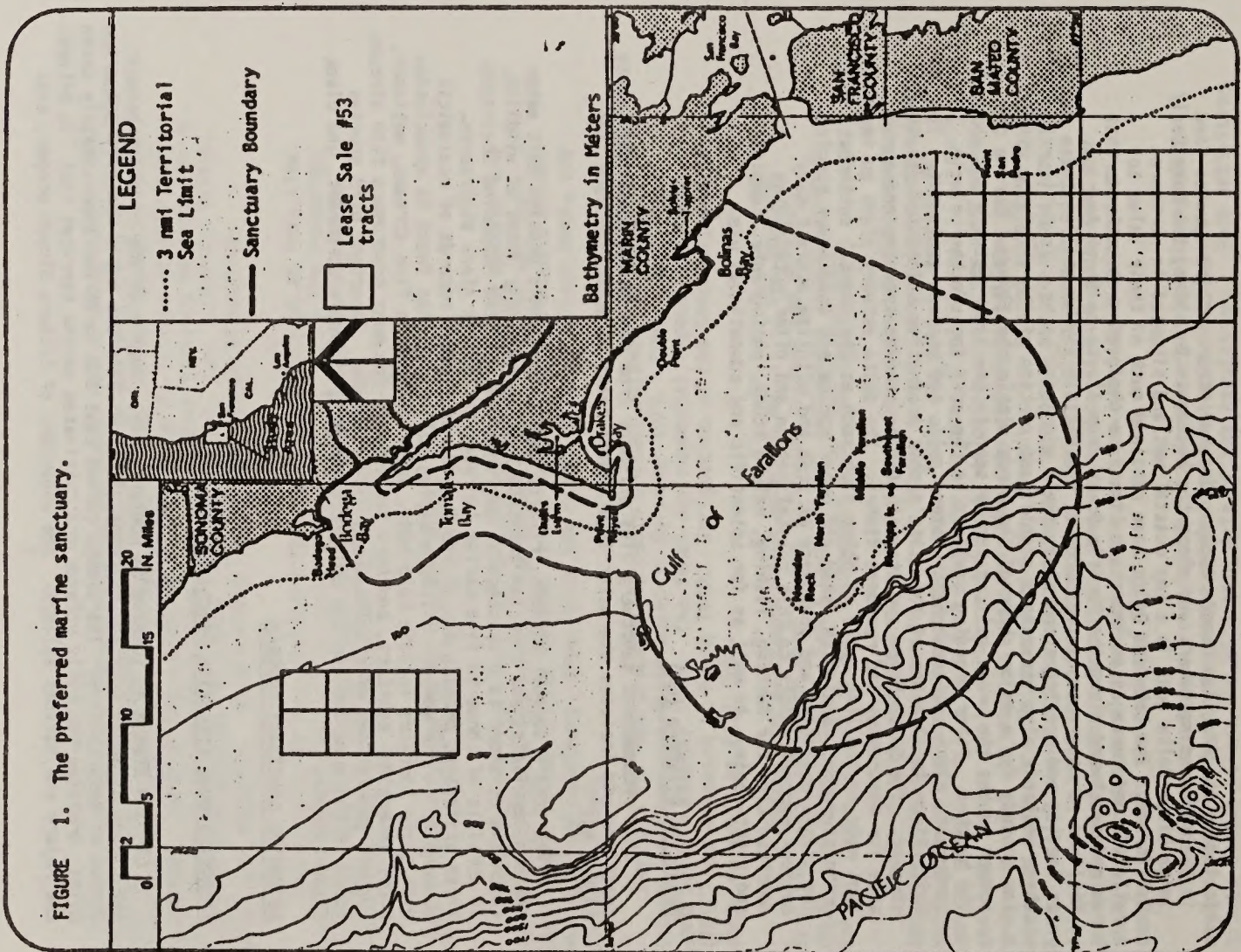
of Moss Landing harbor, is about 70 square miles. The sanctuary itself, which is on the south and east portions of the slough, covers 1,510 acres, but is contiguous with a proposed U.S. Fish and Wildlife Service Refuge on the north and west portions so that the whole slough system will be protected.

Elkhorn Slough is one of the most significant remaining examples of a salt marsh on the Pacific coastal flyway along the California coast, between San Francisco Bay and Morro Bay, providing important feeding and resting habitat for resident and migratory shorebirds and waterfowl. Two endangered bird species and one endangered amphibian species live for at least part of the year at Elkhorn Slough.

The slough serves as a nursery and feeding ground for Pacific herring, starry flounder, several species of sharks, and many other commercially and recreationally valuable fish. Several mariculture operations exist in the lower part of the slough. The slough is used extensively for research and educational purposes at all academic levels.

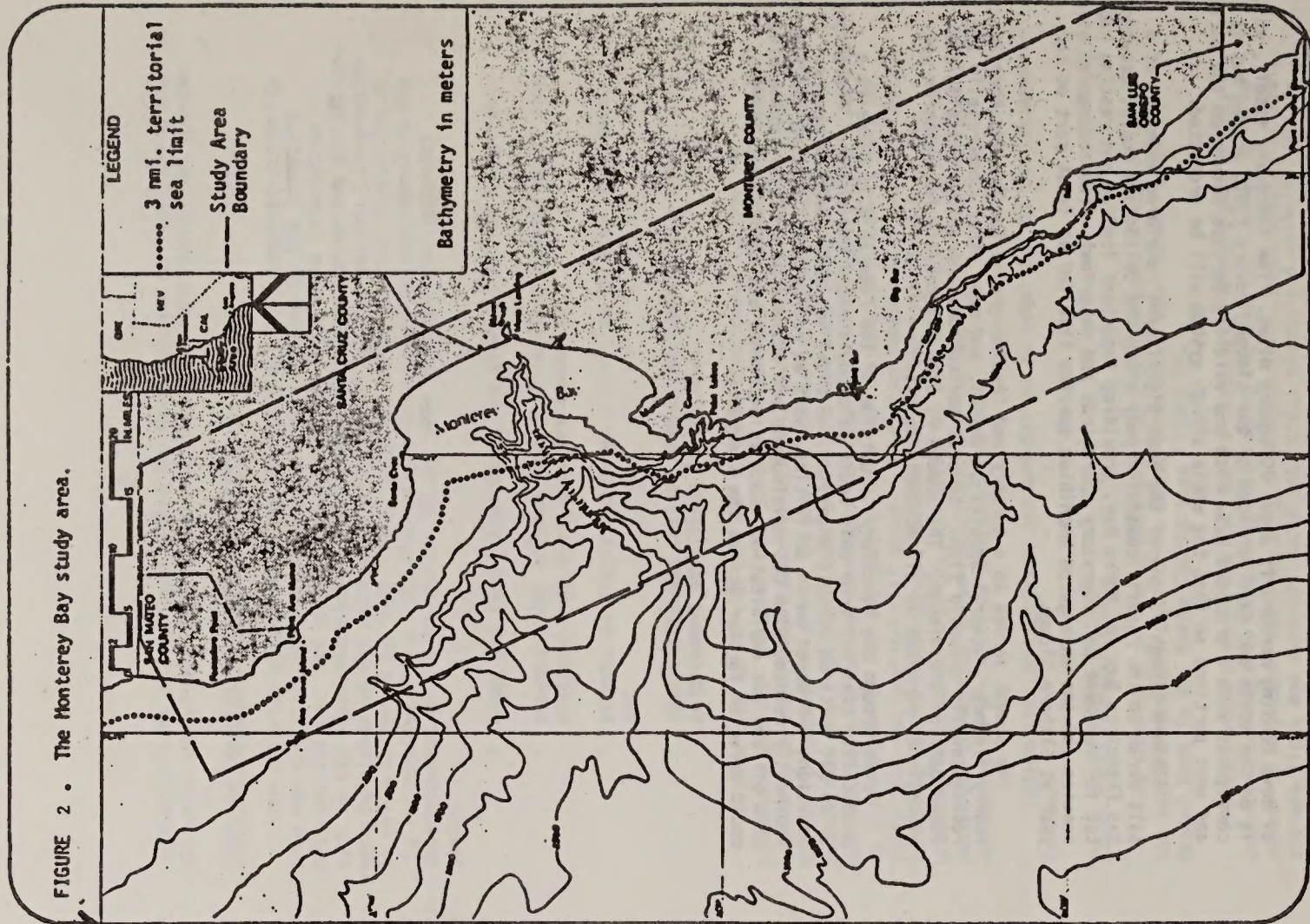
Even though the sanctuary is outside of the Federal OCS, there is a probability that oil from this lease sale could reach the slough. The effect of an oil spill on benthic organisms and tidal wetlands would be severe. In addition, increased human activities, such as recreational boating and fishing, indirectly related with OCS development and actions more closely associated with oil and gas exploitation, such as pipelines and supply boat traffic, could serve to further stress the sanctuary.

FIGURE 1. The preferred marine sanctuary.



C-3

FIGURE 2. The Monterey Bay study area.



E-2

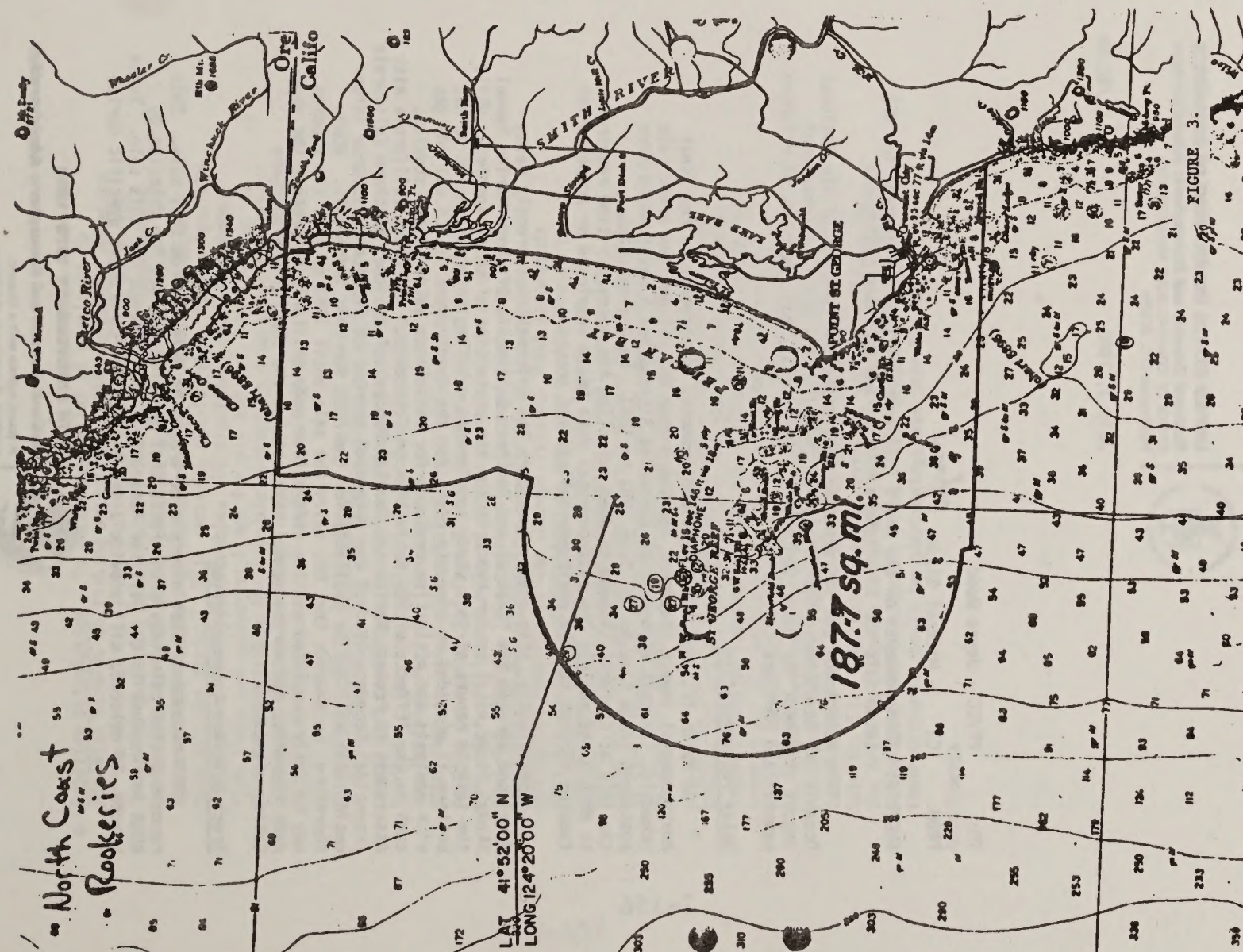
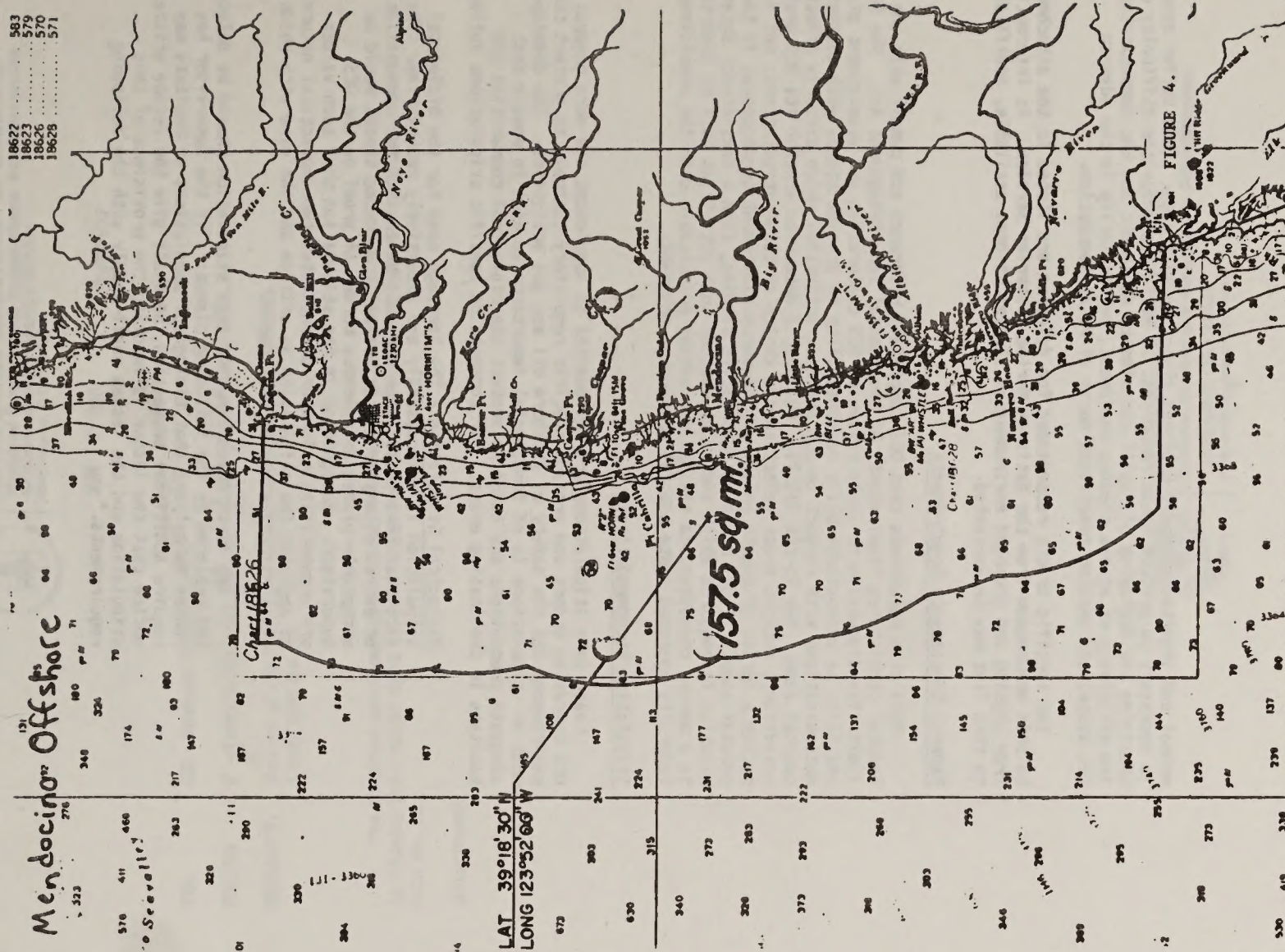


FIGURE 4.

FIGURE 3.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
OFFICE OF COASTAL ZONE MANAGEMENT
Washington, D.C. 20235

July 3, 1980

CZ/RC:RB

TO: PP/EC - Joyce Wood

FROM: CZ - Michael Glazer *mg*

SUBJECT: NOAA Comments on the Draft Environmental Impact Statement for OCS Lease Sale No. 53 Offshore Central and Northern California

This memorandum and its attachments provide the comments of the National Oceanic and Atmospheric Administration (NOAA) on the draft environmental impact statement for Outer Continental Shelf (OCS) Lease Sale No. 53 offshore central and northern California.

Delay recommendation

On March 12, 1980, NOAA provided comments in response to the final environmental impact statement for the 5-year OCS oil and gas lease sale schedule. In that statement we supported Alternative 5 which would have postponed Lease Sale No. 53 from 1981 to 1983. We believe that the sale as currently scheduled does not allow the necessary time required to obtain and analyze the environmental data being developed or proposed for funding through the BLM environmental studies program.

Specifically, this agency considers the information currently being developed through the "Central and Northern California Offshore Marine Mammal Study" to be vital to our concerns for the protection of these species. While the interim report of this study supplements existing information, we do not believe it provides an adequate basis for the development of OCS oil and gas risk analysis and mitigation measures for this lease sale. Other studies, such as the "Effects of OCS Activities on Cetaceans," "Northern California Risk Assessment to Protect Marine and Coastal Habitats," and the "Northern California Intertidal Recovery Study," are potential sources of important resource information that will not be available for the FEIS for this lease sale. NOAA, therefore, recommends that DOI delay the sale until 1983 so that the studies may be fully completed and the information made available to protect the abundant fisheries and marine mammal resources of the central and northern California coast.

Tract Deletion Recommendation

NOAA recommends that ninety-nine tracts be deleted from this sale. This recommendation coincides with tracts that were recommended for deletion by NOAA in response to the Call for Nominations and comments for this sale. These tracts, if deleted, will provide a ten mile buffer to protect specific marine



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tradition of service to the Nation

mammal and important fishery habitats along the sale area. This buffer zone is necessary to protect these resources. It would recognize the difficulty of obtaining and deploying oil spill containment equipment and the demonstrated low efficiency of at-sea cleanup equipment, particularly in the adverse sea states and weather conditions north of Point Conception.

The specific tracts recommended for deletion are listed in the attachment to this memorandum from the National Marine Fisheries Service. As information from ongoing and proposed environmental studies becomes available, modifications to this list may be warranted.

Federal Consistency Requirements

NOAA also recommends that DOI completely reference and comply with the Federal consistency requirements of the Coastal Zone Management Act. The DEIS limits its discussion to state review of OCS exploration and development plans, and fails to acknowledge DOI's responsibility to provide states with consistency determinations with respect to OCS prelease activities which directly affect the coastal zone. See 15 CFR 930.71. DOI should determine whether its OCS prelease activities, such as tract selection and choice of lease stipulations, set in motion a series of events which have resource management consequences in the coastal zone. If DOI makes an affirmative finding, then a consistency determination is required which indicates whether such activities will be undertaken in a manner consistent to the maximum extent practicable with the provisions of federally approved state coastal management programs.

Stipulation Recommendations

Lease sale stipulations are implemented to supplement the more general OCS Operating Orders and provide specific regulatory controls to protect the environment and the safety of offshore oil and gas activities. The development of stipulations is of fundamental importance to NOAA to ensure that adequate precautions are taken to protect the biological communities and habitats in the leasing areas. Our comments on specific stipulations follow.

- o Biological Stipulation - The language used for the biological stipulation is unnecessarily and excessively restrictive. The fact that this stipulation may only be invoked for communities of extraordinary or unusual value in which no threat would be acceptable places an enormous burden of proof on the OCS Supervisor. Recognition in the stipulation that such values are unquantifiable further demonstrates the impractical nature of applying the stipulation as written and the ease with which its application may be challenged.

The first seven lines of this stipulation should be deleted and replaced by the following clause: "If the Supervisor has reason to believe that biological populations or habitats may require additional protection, he shall give the lessee written notice that the lessor is invoking the provisions of this stipulation and the lessee shall comply with the following requirements."



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Washington, D.C. 20235

JUN 18 1980

F/HP:DP

TO: CZ - Michael Glazer
FROM: F. Terry L. Leitzell *Calvin H. Leitzell*
SUBJECT: Review of the DEIS for Central and Northern California
Lease Sale No. 53.

The attached comments and recommendations are provided in response to a memo by Charles Ehler dated April 25, 1980, which requested our review of the DEIS for Lease Sale No. 53.

Attachment

- o Pipeline Stipulation - To encourage burial of pipelines to minimize hazards to fishing activities, NOAA recommends deletion of the sentence (p. 1-70): "All pipelines, including both flow lines and gathering lines for oil and gas shall be designed and constructed to provide for adequate protection from water currents, storm scouring, and other hazards as determined on a case by case basis." This sentence should read: "Where feasible and environmentally preferable, all pipelines, including both flow lines and gathering lines for oil and gas, shall be buried to a depth suitable for adequate protection from water currents, sand waves, storm scouring, fisheries trawling gear, and other factors as determined on a case by case basis."
- o Aircraft Overflight Restrictions - The DEIS does not describe a mitigating measure to restrict aircraft and helicopter overflight traffic in proximity to sensitive marine mammal habitats. For the postleasing phase of Lease Sale No. 48, the National Marine Fisheries Service recommended to the USGS that in the Southern California bight, aircraft traffic be restricted from flying at altitudes below 1000 feet when within one mile of marine mammal rookeries or haul-out grounds. This restriction is consistent with State of California regulations for overflight of the marine ecological reserves of the Channel Islands. NOAA recommends that DOI include notification, as was done in the Beaufort Sea federal-state Lease Sale, that: "The lessee and its agents, contractors and subcontractors shall ensure that fixed wing aircraft and helicopters involved in the development of their lease, do not fly over... marine mammal rookeries or haul-out grounds at altitudes less than 1,000 feet."
- o Fisheries Training Program Stipulation - Potential conflicts between OCS oil and gas activities and the commercial fishing industry can be reduced through the application of a training program for OCS personnel on the methods and practices of fishing operations. Stipulation No. 6 for OCS Lease Sale No. 42 was developed to provide such a training program. We recommend that the fisheries training program stipulation be incorporated without alteration to the stipulations for Lease Sale No. 53. USGS has recently developed minimum criteria for the training programs to be submitted by the lessees in their exploration and development plans. With minor modification these criteria should be adapted to Lease Sale No. 53.

Attachments



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tradition of service to the Nation

131, 134, 137, 138 141,
142, 143, 144-147, 148-151,
153-155, 160, 161, 167,
168, 174, 175, 181, 182,
187-189, 195, 196, 201-203,
207-210, 215-217, 222-224,
227-229, 232-243

Ocean shrimp, harbor seals &
California sea lions.

General Comments

1. The subject DEIS is as thorough in its description of the marine environment as might be expected given the extent of background information presently available. While the need for additional natural resources information is being addressed by ongoing marine mammal and seabird studies contracted through BLM, the DEIS does not emphasize the need for including this information in the later stages of the environmental review process. In our review (memorandum of February 25, 1980) of the five year OCS leasing plan (FEIS), we recommended selection of alternative 5, which delays Sale No. 53 until 1983, to allow completion of current BLM studies of northern and central California. We are concerned that the current leasing schedule would not allow for consideration of results of these studies or the recommendations of investigators in the final decision. We believe this information is essential to the environmental review process. We therefore again recommend the delay of this sale in order that information from those ongoing studies may be included within the FEIS analysis.

2. The DEIS generally reflects the potential for severe impacts of oil related activities on the marine resources of central and northern California. However, we have some specific concerns regarding many of the tracts proposed for lease. In our June 15, 1978 response to BLM's call for nominations for this sale, we recommended the deletion of tracts within ten nautical miles of known plumed hauling and breeding areas, and of other tracts which we felt were necessary to protect fishery resources of northern and central California. We believe a ten nautical mile buffer around the resources of this region is justified because of (1) the reduced availability of oil spill containment equipment, (2) the long time required for deploying containment equipment, and (3) the increased frequency of adverse weather conditions north of Point Conception. We therefore recommend that the following tracts be deleted should BLM decide to proceed with this sale:

Tract

013, 017, 018, 022
023, 026, 027, 030

033

062, 064

071, 072, 075, 076,
078-080, 082-084,
086-088, 091, 092,
094, 095, 098, 099,
103, 107

111-113, 118, 122, 125
127, 128

Resource Conflict

Salmon & crab fisheries, harbor seals.

Ocean shrimp, shellfish, harbor seals
Stellar sea lions.

Harbor seals.

Harbor seals & Stellar sea lions.

Harbor seals, Stellar sea
lions, elephant seals

We believe deletion of these tracts will provide adequate protection to those resources for which we are concerned. The recommendations for deletion are based on information contained in the DEIS and data currently available to NMFS; however, we may wish to recommend further deletions or modifications pending availability of the results of ongoing studies.

3. Many of the data presented in the discussion of fishery statistics and price information are obsolete. In many cases, 1974 data are used. We suggest that preparers refer to the appropriate Fishery Management Plans, where available, for more up-to-date information.

4. The DEIS does not contain a discussion of the importance or contribution of this lease sale to local or national energy needs. The FEIS should include a discussion which compares the value of holding the sale to the potential adverse impacts of development of the natural resources of the area.

Specific Comments

Page 1-8: The discussion of the delay of the sale alternative does not note that such environmental studies are already in process. A delay would ensure inclusion of the results of these studies in the environmental review process. The FEIS should incorporate the findings of these studies.

Page 1-9: OCS actions involving fishermen's concerns expressed at scoping meetings for gear entanglement and vessel damage are discussed. However, consideration of these concerns for OCS impacts on fishery resources are not reflected through development and evaluation of alternatives which incorporate measures designed to protect sensitive fishery resources. Deletion of the tracts listed above will protect the fishery resources of concern.

Page 1-13: The environmental parameters proposed to be monitored, the frequency of sampling and the sample size should be listed for these studies.

Page 1-20: Locating the proposed oil and gas storage and treating facilities offshore from Santa Cruz probably would result in a greater chance of oil spills which could impact nearby marine mammal populations. We recommend that oil be transported to shore for storage and treatment at this location.

Alternatives should be presented in the event the proposed Santa Barbara County pipeline is not constructed or completed in adequate time to handle production from Sale No. 53.

Page 1-42. Endangered Species Act was enacted in 1973.

Page 1-43. Insert "National Marine Fisheries Service (NMFS)" after "(NOAA)"

Page 1-72: Last sentence. What will be the response time of the shore-based oil spill contingency team? When will a draft oil spill contingency plan be available for review? This is obviously an item of critical concern since tracts may be located as close as 3 miles from shore.

Page 2-3: 2nd para. Discharge of residual chlorine may, in addition to "inhibiting" algae and bacterial growth at the discharge, also decrease other benthic populations as well. What will be the area affected? Very few long-term studies of drill muds have been conducted, hence the conclusion that "no studies have been found which show sub-lethal effects".

Page 2-4: A statement should be included to indicate that the pinniped species most frequently sighted during the ongoing BLM surveys of northern and central California is the northern fur seal (*Callorhinus ursinus*). This fur seal has been shown to be severely impacted by oil on the pelage. Oiled fur can result in reduced vigor and may lead to death. Such spills could therefore result in "high long term impact to" individual pinnipeds depending on the spill site, season, and other factors.

Page 2-9: What is the basis for predicted recovery times for Pacific herring, northern anchovy and salmon?

Pages 2-15-17: The text states that this alternative will increase the distance between OCS activities and pinniped areas. However, the text on page 2-17 states that this alternative would not significantly reduce the potential impact on marine birds and mammals. If currents are alongshore, as noted, then it would seem that less potential impact to pinnipeds would result from this alternative. The discrepancy should be clarified.

Since grey whale migration routes probably include a considerable portion of the area further offshore from the proposed three mile buffer (Rice and Wolman, 1971), the alternative only considers a portion of the migrating grey whale route and does not increase the distance between OCS activities and the hypothetical "route" shown in the text.

Page 2-18: The discussion (paragraph 2) of recoverable resources implies that the potential loss due to selection of this alternative would equal 404 million barrels. We suggest rewording this paragraph to reflect the actual portion of reserves lost from the deletion of area P-8.

It should be noted that selection of this alternative also would increase protection for populations of California sea lion and harbor seal present along this coast.

Page 2-27: Footnote "a" is missing.

Page 2-28 This section should be amended to reflect comments for page 1-8.

Page 3-43, 46: The use of the intertidal zone for hauling and breeding purposes by pinniped species should be mentioned.

Page 3-51: The text makes no specific reference to species classified as endangered. Reference to the list presented on page 3-62 would suffice. A specific mention of the endangered status of the grey whale should be made.

Page 3-51: The last sentence, second paragraph, is unnecessary and should be deleted.

Page 3-52: We recommend that the FEIS note that the information contained in the third paragraph is very preliminary (Dohl et al, 1979). Because grey whales may be migrating farther offshore than has been observed by Dohl, we recommend that ongoing studies of cetacean distribution of the central and northern waters of California be completed and that the results be included in the FEIS. Should this not occur, we suggest that the reference to this preliminary information be deleted; consideration of these data could lead to an inaccurate analysis of oil development impacts on migrating whales.

While discussion of this section centers on the grey whale, there are five other cetaceans in this area that are listed as endangered. These should be identified. A discussion of what is known about their distribution and abundance and of the potential impacts on food sources, requirements, and other factors should be included.

Page 3-52: No mention of contracted work regarding pinniped distribution and abundance is made. This information should be included in the FEIS. For example, new information obtained in these studies has noted that "Harbor seals were seen at over 150 locations along the coast; they were far more numerous than we expected" (BLM field work survey CS-01, 1980). Observations such as this are important in evaluating the potential impacts of OCS activities and developing mitigation measures.

Page 3-55: The subspecies name of harbor seal is richardii (Shaughnessy and Fay, 1977).

Page 3-63 Table III.A.2.C-1: The currently accepted specific epithet for the grey whale is "robustus."

Page 3-144 Table III.C-1: The Point Arena area has a large population of harbor seals (BLM Field Survey CS 01-1980).

Page 3-89: The statement that half of all fish landed in California ports are caught in California waters is true but not pertinent. The FEIS should note that most fish landed in ports within the sale area are caught off California. In addition, landing information and the discussion of trends in total catch should be updated.

Page 3-91: There is no direct foreign fishery allowed for rockfish, sablefish or jack-mackerel south of 39° N. latitude. The foreign fishery for hake is allowed only north of 39° N. latitude. Small catches of rockfish, sablefish, and jack-mackerel are permitted to be taken incidental to hake.

Page 3-94: Halibut are fished extensively in areas other than Morro Bay and Monterey. The draft Fishery Management Plan for Groundfish is a good source of information for this discussion.

Page 3-96: The status of sablefish and sub-populations is uncertain. Although there appears to be a limited exchange between stocks, long distance migrations have been reported.

Page 3-97: The catch data should be updated. The California catch of sablefish in 1978 totaled 10,125 metric tons. Preliminary data indicate a 1979 catch of between 9,000 and 10,000 metric tons.

Page 4-15: The percentage probabilities of an impact hitting a shoreline segment or resource category is determined solely by the hypothesized position of the "spill". The three day probability figure in Table IV.A.1-4 for most of the segments or resources is "0", but this figure could be pushed closer to 80 or 100 percent should the spill be assumed to occur more closely to shore (which it apparently could).

Page 4-82: "Cumulative Impacts on Water Quality". There is no apparent data base to justify the statement that "water quality will remain good" with cumulative drilling from existing and proposed OCS activities. To make that kind of determination, a predictive model should be employed using site specific data from the Tanner Banks study, or from any other rig study in a similar ecosystem.

Page 4-92 Table IV.B.C.-1: NMFS is concerned that construction and operation of onshore facilities may result in the chronic disturbance of nearby, sensitive marine mammal reproductive areas. This type of disturbance would probably result in the abandonment of rookery sites; such an end result would be contrary to the intent of the Marine Mammal Protection Act. Therefore, should such facilities actually be proposed, we recommend that sites be selected carefully and that potential impacts on marine mammals be evaluated in every instance in consultation with the NMFS.

Page 4-93: Suggest "moderately" be changed to "highly" for impacts discussed for pinnipeds.

Page 4-94: The text previously uses "2,000" as the sea otter population estimate and here quotes "1,500," these should be corrected for consistency.

Page 4-98: The following two sources should be cited in Chapter 5: "References:" Fraker (1978), Calkins and Curatola (1979).

The discussion of impacts on cetaceans should include several important points. We believe that the migration routes of grey whales may pass immediately adjacent to, or through a considerable area within the tracts proposed for leasing in this sale. Increase in OCS activities such as vessel traffic and drilling operations pose a threat of direct impact and disturbance to individual migrating grey whales. Such disturbance over the lengthy area of consideration has the potential to cause a broadening of the migration route, such has been hypothesized (Dohl et al, 1979) for the waters of the Southern California Bight. However, information available is currently not adequate to substantiate this hypothesis and does not allow for an accurate appraisal of the cumulative impacts of OCS development on migrating grey whales. Because the understanding of this problem is currently so limited, NMFS would like to assist BLM in the development of studies which examine the interactions between OCS activities and grey whale migrations. As individual tract development proceeds, we may be able to assist in the design of mitigating measures which would minimize the risk of adverse impacts on migrating grey whales.

Page 4-100: The FEIS should note that recent observations made along the Southern California coast indicate that grey whales may be feeding on mysid shrimp and other small invertebrates occurring on or around kelp plants. This reference should be made that this feeding behavior increases the potential for "the bottom-feeding grey whale" to ingest surface oils collected in kelp beds as the result of spills.

Page 4-101: The Bureau of Land Management has determined that this lease sale may affect threatened or endangered species populations that occur in the project area and has initiated consultations with the Fish and Wildlife Service and the National Marine

Fisheries Service, according to Section 7 (a) of the Endangered Species Act of 1973, as amended, to determine whether or not this project will jeopardize the continued existence of any threatened or endangered species. Since these consultations have yet to be completed, the inclusion of and jeopardy conclusion in this DEIS is premature. We recommend that this statement be replaced with a statement that reiterates the language on page 1-11 regarding biological opinions.

The DEIS may be underestimating the potential for adverse impacts on cetaceans. First, the disturbance due to vessel traffic or noise should be given more attention; these factors may impact whales more than oil spills. Second, migratory whales are likely to encounter disturbance along the entire length of California, not just the immediate lease areas. Vessel traffic to and from leases and the dispersion of contaminants by currents will go beyond the tracts leased. Third, while cetaceans are migratory, as noted, there have been documented instances of congregation for feeding in the Southern California Bight. There also have been unpublished observations of concentrations of blue whales off the coast of Monterey. Thus, although the probability of an oil spill may be low, a "worst case" could affect a large number of animals. We recommend the FEIS address these points more thoroughly.

Page 4-11: The Point Reyes area should be included in the analysis presented on Table IV.B.2.D-3.

Page 4-117 (next to last line): This summary sentence described what the impact is not expected to be. Perhaps the discussion should be changed to describe what impacts are expected; e.g., "Cetaceans, pinnipeds, and seabirds...(etc.) are expected to be impacted to only a moderate degree."

Page 4-119: The cumulative impacts of disturbance to pinnipeds and migrating cetaceans, while poorly understood, should be considered over their respective ranges. Repeated instances of OCS related disturbances to a single individual along the migratory pathway could result in an increased level of stress with unknown results.

Page 4-148: It is not always easy to determine the areal extent or pattern of oil spills, i.e., witness the patchiness of the Ixtoc Spill. It is thus not difficult to envision fishermen coming into contact with floating oil and contaminating their gear, the boat and the catch as well.

"Oil Spills". This section does not attempt to quantify losses to the commercial fisheries from oil spills. In order to evaluate these economic losses, the following factors must be determined: 1) the size of the spill based on amount of oil spilled, spreading rate, magnitude of the wind, etc., 2) the direction the spill will drift, 3) whether it is expected to remain at the surface, or will it sink (thus affecting a different sector of the fisheries), 4) how long the spill will remain toxic, 5) how large a segment of the shoreline will be eventually covered by the spill, 6) the most likely spot for the spill to occur and where such a spill may do the maximum damage to a fish population, 7) what losses would be expected to be suffered by eggs and larvae, thereby affecting future year classes and 8) how do these losses translate to eventual economic losses throughout the fishing industry, including fishermen, processors and those people employed in the marketing of the product.

Page 4-148: The statement that structures could result in an increase in the fish population, by reducing available fishing area, should be deleted. This statement would be correct only to the extent that primary fishing grounds become unfishable and fishing effort cannot be relocated to make up for the "lost" area.

Page 4-150: Section (3). For what period of time could spawning areas remain non-receptive to spawning because of a spill which contacts bottom? Again, how do these losses translate in terms of losses to the fishery?

Page 4-151: Table IV.B.5. a-1. The calculations which were used to develop mortality estimates should be presented either in the text or as an appendix.

Page 4-151: Man made structures are not likely to result in beneficial impacts on flatfish, lingcod and shrimp. NMFS also believes that discharge of drill cuttings has a negative impact on most species. Table IV.B.5.A-1 should be revised accordingly.

Page 4-154: The statement that fish populations benefit from reduced fishing pressure should be removed. Total fishing effort is likely to remain at current levels even if man made structures are put in place. There may be some change in age class or size distribution of species on a localized basis, but the extent of change is likely to be minimal.

Page 4-155: The calculation of "acre months removed from fishing effort" serves no purpose. The extent of loss to commercial and recreational fishing will depend on the number and sites selected. Site specific studies will be required for this determination. The "acre-month" approach should be deleted.

Page 4-156: We believe that the figure of \$7,500 for a trawl net is low and recommend that a West Coast net manufacturer be contacted to determine these costs.

Page 4-157: We believe that the discharge of drill muds, cuttings, and other effluents places a general stress on the environment and, therefore, could have significant adverse impacts on any species found in the vicinity of the discharge. This should be noted in the FEIS.

The statement that changes in vessel traffic would not affect commercial fisheries is speculative. Any route changes should be carefully planned to avoid traditional fishing areas.

Page 4-158 Cumulative Impacts — The statement that "Fish and invertebrate populations are already stressed by heavy fishing pressures and industrial, agricultural and domestic pollution," is a generalization which probably can not be substantiated. Most fish stocks are managed at or below maximum sustainable yield, a level which does not stress the populations. Pollutants no doubt stress certain species, especially those which in some point in their life-cycle migrate to or through estuarine areas. The statement that there are "no significant cumulative impacts in central and northern California between the proposed and existing OCS leases" is unclear and seems doubtful. Whereas the probability of a major blow-out may be low, the impacts of such an event could be severe and long lasting to commercial and recreational fisheries.

Page 4-196, paragraph 2, line 7: Suggest rewording of this sentence to: "A few individuals of endangered species populations may be adversely impacted by spills..." Further consideration of this matter will be addressed in the Section 7 consultation process by the NMFS.

Paragraph 2, line 13: "pimpipeds" is misspelled.

Visuals

Visual No. 7 Marine Birds and Mammals: This chart was prepared on 11/24/78, which was prior to completion of any input from contracted baseline research. This chart does not show the pelagic distributions for areas of marine mammal and seabird concentrations, or the locations and importance of feeding areas for these species. The chart is very difficult to read and to use when evaluating the species present and their relationships to proposed leasing areas.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
OFFICE OF COASTAL ZONE MANAGEMENT
Washington, D.C. 20235

July 2, 1980

CZ/RC:RB

TO: CZ - Michael Glazer
FROM: CZ/RC - Charles N. Ehler *CNE*
SUBJECT: Review of the DEIS for Central and Northern California Lease Sale No. 53

Attached are specific page-by-page comments on the DEIS for Lease Sale No. 53.

Page 1-6. Tract Selection - The implication of this paragraph is that tract selection is based primarily on avoidance of areas involving the greatest environmental risk. We have been informed by various BLM staff that tract selection is based almost exclusively upon industry interest. DOI's position regarding the weight given tracts of environmental concern during tract selection, when they are also considered of high interest to industry, should be clarified.

Page 1-13. Environmental Monitoring - Indicate how decisions made concerning implementation of BLM environmental monitoring studies for particular tracts will differ with the decisionmaking process of the USGS OCS Supervisor to protect special areas under proposed Stipulation No. 1.

Page 1-21. Projected Transport and Markets - Comment on the possibility of oil recovered as a result of Sale No. 53 being transported to the Northern Tier pipeline. Is this not a possible scenario if the sulfur and API ratings of the oil exceeded that of Alaska North Slope crude? Consider the resultant impacts of tanker traffic northward along the California, Oregon and Washington coasts.

Page 1-42. Department of the Interior - Elaborate on USFWS responsibilities under the Endangered Species Act in accordance with the proposed action. There is no reference in this document to the USFWS mandate to provide biological opinions under the ESA to DOI for lease sale decisions.

Page 1-44. Coastal Zone Management Act - Add the Coastal Zone Management Act of 1972, as amended, and the Outer Continental Shelf Lands Act, as amended, to the list of Department of Commerce responsibilities.

Page 1-76. Oil Spill Prevention and Mitigation - The last sentence of this section describes only 2 oil spills greater than 50 barrels last year on the U.S. OCS. This statement could be misleading to the decisionmaker. It should be noted that this does not include spills from tankers. Additionally, a more comprehensive statement on the safety of OCS activities is provided in the USGS report, Outer Continental Shelf Oil and Gas Blowouts, Open File Report 80-101, which notes that in the 8 year period from 1971-78, 46 blowouts occurred on the U.S. OCS.

Page 1-76. Oil Spill Modeling - It should be noted in this section that the oil spill risk analysis model utilized for the EIS is purely predictive and was not designed to provide operational, real-time data to be used in the event an oil spill occurs. The first sentence of the section indicates such a use.

Page 1-78. Interrelationship of Proposal with Other Projects and Proposals - This section should contain a discussion of the Coast Guard study on Port Access Routes (PARS) off central and northern California. The designation of vessel routing lanes will have a major impact on the safety of marine OCS traffic and pollution prevention. In the NOAA comments to the Coast



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Guard, we proposed, among other things, that PARS not pass through the proposed boundary of the Point Reyes/Farallon Islands marine sanctuary. A discussion of the PARS study should also be included in Section II B. 4 (Delay the Sale Alternative) and Section III D. 2c (Transportation Systems).

Page 2-3. Water Quality - Line 14 of this page states "...no studies have been found which show sublethal effects from drill mud and cuttings." The FEIS should reference the numerous studies presented at the January 1980 symposium on "Research on Environmental Fate and Effects of Drilling Fluids and Cuttings." In addition to the smothering effect of muds and cuttings cited repeatedly in the DEIS, a recently completed monitoring study at a rig off Atlantic City, New Jersey, showed that the abundance of crustaceans, annelids, and molluscs decreased during drilling. Abundance of these species was inversely correlated with discharged clays "beyond the immediate vicinity of the well site." (An Environmental Monitoring Study to Assess the Impact of Drilling Discharges on the Benthic Community, EG & G Consultants, 1980, p. 24). This impact was observed at the furthest monitoring station located 800 meters from the drill rig and could have extended beyond that point. The FEIS should provide a brief, documented analysis of the expected extent of impacts from drill muds disposal.

Page 2-9. Commercial Fishing - We have no way of judging the accuracy of the statement, "Other species are considered to be highly susceptible to oil spills, but are not anticipated to be impacted due to the very low probability of an oil spill occurring in the areas they inhabit." The species considered should be listed.

Page 2-10. Commercial Fishing - The dollar figures listed for the impact of an oil spill to fisheries on this page are so speculative as to be misleading. Calculating these values involves many assumptions about the oil that may be found, the resultant number of spills, the future value of the fisheries, and hypothetical correlations between the impact of the Santa Barbara spill and other California areas. These estimates should be deleted, but we recommend that the last line of this section be retained.

Page 2-22. Summary of Environmental Consequences - The probability of a spill hitting the sea other range in 30 days should be included in the text of the first paragraph of this page.

Page 2-24. Conclusion - The sentence, "This alternative (deletion of tracts to protect the sea otter) would not result in a significant reduction in the number of spills expected to hit this area", contradicts the following sentence which reads, "However the probability of one or more spills hitting this area as a result of the proposed sale is reduced significantly." This contradiction should be clarified.

Page 2-25. No Sale Alternative - We do not believe that inclusion of the assumption that "other domestic energy sources also fall below anticipated levels" is germane to the discussion of the effects to the economy of not holding OCS Sale No. 53. The economic impact to the U.S. should be based solely on the deficit of the 548 million barrels of oil and 621 billion cubic feet of gas estimated as undiscovered recoverable resources for the proposed sale.

Page 2-27. No Sale Alternative - Since the programmatic EIS for the 5-year OCS leasing schedule (January 1980) is referenced for information regarding alternative energy resources, we question why information concerning the future U.S. energy mix on page 2-25 refers to a 1977 publication from the Executive Office of the President. A more current reference should be used.

Page 2-28. Delay the Sale Alternative - The delay alternative was a major issue raised in the scoping meetings. Recognizing the viability of this alternative, we find the cursory treatment on page 2-28 given this alternative to be inadequate. A more thorough analysis of delay is provided in the final programmatic EIS for the 5-year leasing schedule on page 75. There is no substantive analysis of the potential benefits and risks of pursuing a delay. Passing reference is made to the possibility of technological innovations and the chance that industry "could, perhaps" extend oil and gas operations into deeper water. The tentative and cursory nature of these statements is puzzling. In the Mid-Atlantic and North Atlantic DOI has selected many deepwater tracts with assurances that technology is capable and constantly improving its ability to operate at these depths. This section on delay should address specifically the benefits derived from the future implementation of Best Available and Safest Technologies (BAST) regulations and describe specifically the environmental studies that will be complete in one to two years and what important information is expected to be obtained from those studies. We recommend that the FEIS, at minimum, begin with the analysis of the delay of this sale as provided in the final programmatic EIS for the 5-year leasing schedule.

Page 3-25. Ocean Physical Forces - Information is provided concerning wave height during the ten most severe storms from 1951-60. This is useful but we recommend that the FEIS include statistics on average wave height for each OCS basin being considered and the percentage of time that the wave height exceeds 8-10 feet. This is the maximum sea state for which the Coast Guard estimates oil spill clean up equipment can currently operate.

Page 4-1. Oil Spills - The BLM platform oil spill model as described simply couples the probability of a spill with average currents and a Monte Carlo sample of the winds. Reference is made to a study by Lanfear, et al., 1979. What neither the DEIS nor Lanfear mention, however, is that the study by Stuart and Kennedy (Lanfear's reference #6) found that some platform blowouts are caused by extreme natural events. Blowouts are also typically among the largest spills according to their study. It follows from this that the largest spills may also occur with the highest winds and waves. A simple coupling of spill probabilities with winds and currents is not sufficient. Such sampling will underestimate the number of spills occurring under extreme conditions. We recommend that BLM add a section discussing extreme weather events, and the effect of these on the probability and impacts of a spill.

Page 4-11. Cumulative Impacts - The statement is made that "the risk of a spill occurring should be reduced as local oil would be transported in American ships with American cargo operating under rigid safety training requirements." The FEIS should provide current statistics regarding the percentage of foreign oil imported on foreign ships with foreign crews to central and northern California ports.

Page 4-26. Vessel Traffic - The potential use and risk of foreign flag tankers transporting oil from the Sale No. 53 area to refineries in the Caribbean should be discussed under Scenario No. 3. Foreign tankers are currently being used to transport Alaskan oil to the St. Croix, V.I., refinery.

Page 4-28 Noise and Other Disturbances - It is unclear what "other disturbances" are discussed in this section besides noise. This section should be expanded. We believe that noise impacts can and should be discussed in this impact statement and should not be deferred as suggested on this page until publication of a developmental EIS. We are specifically concerned about potential disruption to the mammals and birds from noise emitted from helicopter and airplane overflight.

We suggest that the FEIS analyze the possible noise related impacts to sensitive wildlife habitats located in proximity to Lease Sale No. 53 tracts and the anticipated corridors for OCS service traffic. The treatment of this issue on pages 4-96 and 4-98 is minimal.

Page 4-120. Cumulative Impacts on Marine and Coastal Ecosystems - The first sentence of this page asserts that "The longterm cumulative effects of formation water discharges and noise pollution on marine mammals and seabirds is generally unknown." The next sentence directly contradicts this assertion by stating that "The endangered and threatened species...should not be affected by OCS cumulative impacts with the possible exception of the sea otter." Since consultations under the Endangered Species Act for this sale and subsequent California OCS sales have not been completed, and recognizing the paucity of information concerning direct impacts of OCS activities to threatened and endangered species, we recommend that the second sentence on this page be revised to reflect current scientific uncertainty.

Page 4-153. Impacts on Commercial Fisheries - Our comment on page 2-10 applies to the value figures given on this page.

Page 4-155. Marmade structures - There is no requirement in the pipeline stipulation as currently drafted to require burial. We suggest the last sentence on this page be revised to reflect the language of the stipulation.

Page 4-156. Marmade Structures - The second sentence of the first paragraph indicates that fishermen may snag their nets on subsea completions. It should be mentioned that the pipeline stipulation requires subsea wellheads to be protected to allow trawl gear to pass over the structure without snagging.

Page 4-157. Discharges and Effluents - Under this heading the document states "The discharge of drilling muds, cuttings, formation water and sewage is anticipated to have a significant impact upon three commercial fisheries: shrimp, spot prawn and salmon. The bottom substrate texture mud and cuttings could deleteriously impact their habitats. Salmon could be affected by these discharges by having the natural environmental cues, used for navigation to their home streams, altered." However, the summary on page 2-3 states that

no studies have been found "...which show sublethal effects from drill muds and cuttings." Furthermore, pages 2-10 and 11 indicate that "these impacts will not be large enough to distinguish them from annual variations in catch statistics." It is difficult to conceive that an impact can be both "significant" and indistinguishable at the same time.



UNITED STATES DEPARTMENT OF COMMERCE
Maritime Administration
Washington, D.C. 20230

June 3, 1980

MEMORANDUM FOR: Bruce R. Barrett
Acting Director
Office of Environmental Affairs
Department of Commerce

Subject: Draft Environmental Impact Statement - Proposed 1981
Outer Continental Shelf Oil and Gas Lease Sale Offshore
Central and Northern California, OCS Sale No. 53
(CN 8004.24)

In accordance with your memorandum of April 23, 1980, the Maritime Administration has reviewed the subject Draft Environmental Impact Statement and offers the following comment for your review and consideration.

1. Pipeline Stipulations, pg 1-70

Discussion

In the draft statement it is stated that if surface transportation must be employed, all vessels used for carrying hydrocarbons to shore from the lease area will conform with all standards established for such vessels, pursuant to the Ports and Waterways Safety Act of 1972.

Comment:

The Port and Tanker Safety Act, which amends the Ports and Waterways Safety Act, contains standards which tank vessels must meet. Subsection (7)(m) of Section 5 will require a crude oil tanker which is engaged in the transfer of oil from an offshore oil exploitation or production facility on the Outer Continental Shelf of the United States, not later than June 1, 1980, be equipped with segregated ballast tanks, or may operate with dedicated clean ballast tanks or special ballast arrangements. The Coast Guard published in the Federal Register of May 1, 1980 a notice of proposed rulemaking implementing this section of the Act.

Kenneth W. Forbes

KENNETH W. FORBES
Chief, Division of Environmental Activities
Office of Shipbuilding Costs

AIR RESOURCES BOARD

1102 Q STREET

P.O. BOX 2815

SACRAMENTO, CA 95812

EDMUND G. BROWN JR., Governor



June 20, 1980

William E. Grant

Manager

Pacific Outer Continental

Shelf Office

1340 W. Sixth Street, Room 200
Los Angeles, CA 90017

Dear Mr. Grant:

Subject: Comments on the Draft EIS for the
Proposed OCS Oil and Gas Lease
Sale No. 53

Introduction

The Department of the Interior proposes to offer for lease a total of 243 tracts off the northern and central California coast for oil and gas exploration and development. Tracts are typically 3 mile by 3 mile squares. The tracts are between 3 and 27 miles from shore, in water depths ranging from 162 to 2,437 feet. The tracts are in five separate blocks: Eel River (30 tracts), Point Arena (30 tracts), Bodega (8 tracts), Santa Cruz (60 tracts), and Santa Maria (115 tracts). Estimated reserves are 548 million barrels of oil and 621 billion cubic feet of gas.

Only natural gas is expected to be found in the Eel River tracts, but both gas and oil is expected to be present in the other tracts. If the lease occurs on schedule in May of 1981, an estimated 403 wells will be drilled between 1981 and 1993, 13 platforms will be erected, and two subsea or floating production systems will be installed. Production is expected to extend beyond the year 2000. Resources in the Bodega tract are expected to be small enough so that all oil would be transported by tanker or barge. In other tracts, all natural gas will be transported by pipeline, and oil will be transported either by pipeline or tankers and barges, depending on the size of the resources.

General Comments

Our primary concern with the Draft is the conclusion (restated several times in the Draft) that all significant

Mr. Grant

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air quality impacts will be mitigated by the United States Geological Survey (USGS) air quality regulations for OCS leasing developments. There is no analysis or information presented in the Draft which would substantiate this claim. Even if this oversight is corrected in the final EIS, interested parties will not have an opportunity to review and comment on such an analysis.

Our analysis has indicated that the USGS air quality regulations contain a number of flaws and will provide little in the way of mitigation. In the past, we have commented on the deficiencies in the regulations (see Attachment) and the following is a brief summary of those comments.

1. The air quality regulations are ineffective, since the responsibility for determining compliance rests with the lessee, and the regulator acts only as a reviewer.
2. The regulations do not require an analysis of all emissions associated with a development. Transit emissions from tankers, barges, crew boats, and supply boats are not considered. In addition, it is not clear that the effect of cumulative emissions from several developments or several stages of development for a single production unit will be considered. Mitigation requirements are much less stringent for emissions during the exploration and construction phases than during the production phase.
3. The emission exemption limit of 100 tons per year (46 tons per year proposed for California) at three miles from shore would allow massive sources to be sited without any mitigation. Since many of the air quality standards have averaging times of 24-hours or one hour, an emission exemption limit based on emissions averaged over one year obviously will not protect onshore air quality. This concern is especially critical for volatile organic compound (VOC) emissions, where average hourly or daily emissions may be relatively low, except for huge periodic increases during tanker or barge loadings.
4. The regulations assume that the impact of a source three miles from the shore is identical to the impact of a source that has twice the emissions and is located six miles from shore.

The regulations thus allow the emission exemption limit to increase with increasing distance from shore. However, the regulations do not acknowledge that the larger source further from the shore will impact a greater area than the smaller, closer source. Moreover, recent ARB studies have indicated the maximum onshore concentrations from OCS sources are not linear with distance, and that the larger and farther source would result in maximum onshore concentrations substantially greater than such concentrations from the smaller, closer source. Even more severe is the doubling and tripling of the exemption limit for VOC sources six and nine miles from shore respectively, as ozone concentrations from OCS emissions will occur dozens of miles downwind of the source, which would place the peak impact in onshore areas that are already violating ozone standards.

5. The significant onshore ground level concentration test should not be the basis for determining whether mitigation is to be required. The concept that a source must make a specific contribution to be significant is meaningless and absurd. If this concept applied to onshore sources, then almost no onshore sources would be controlled, and air quality in California would be drastically worse than it is today.

6. The regulations will not protect state ambient air quality standards. Even if a source exceeds the annual emissions exemption level and the significant concentration levels, only BACT, not tradeoffs, are required if the impact area is attainment for the federal standard. This situation is true even if the OCS emissions will cause a violation of the state standard in an area where this standard is not violated, or will exacerbate existing violations. Moreover, the regulations do not protect state standards for pollutants which are not federal criteria pollutants.

7. The regulations do not address precursor relationship, and thus are wholly inadequate to protect oxidant (ozone), sulfate, and particulate air quality standards.

8. The regulations would result in onshore and offshore sources being treated substantially different, despite the fact that emissions from both may be impacting the same area. The regulations are not consistent with the Clean Air Act,

although this was the intent of Congress when the legislation requiring the adoption of air quality regulations was passed.

Since the Draft did not include an analysis of the effect of the air quality regulations on unmitigated project emissions, and there apparently will be no comment period if such an analysis is included in the final EIS, we have made a limited analysis of Lease Sale #53 which points out severe air quality impacts will occur even with the mitigating effects of the air quality regulations. Three specific cases are discussed below.

1. Point Arena - The Draft indicates unmitigated emissions will cause violations of the state oxidant standard in the onshore area next to the Point Arena tracts. Since this area is attainment for both state and federal oxidant/ozone standards, full mitigation will not be required.

In fact, it is unclear whether any significant mitigation will be required. Although the use of best available control technologies (BACT) will be required for hydrocarbon emissions from developments having massive emissions, USGS has yet to define what BACT may be for OCS developments.

Several technologies for controlling OCS emissions are based on systems used to control emissions from onshore facilities. Control systems that have been proposed for or used to control OCS emissions include vapor recovery control, H_2S control, Claus plants, and Stretford units, but it is unclear whether USGS will require such control on future development. The air quality regulations require the lessee to determine what BACT shall be for a project, and thus there is no economic incentive for the lessee to claim certain control systems as BACT because a BACT determination must take cost into account. There are no guidelines in the regulations to determine when costs are excessive. Thus it is unclear and uncertain what control equipment will be considered as BACT for OCS developments.

Some idea as to how BACT may be defined can be found in POCS Reference Paper No. 53-5, which discusses air quality for Lease Sale #53. Although Exxon has agreed to use a vapor recovery system for tanker loadings at their Hondo facilities,

and Santa Barbara County Air Pollution Control District has adopted rules and regulations requiring vapor recovery systems for tanker loadings, this reference paper indicates that such systems may not be BACT. On page VII-8, this paper states "These [vessel loading vapor control equipment] costs could conceivably be interpreted as too great and thereby render retrofit 'impractical'." On page VII-9, in discussing procedural changes to reduce ballasting emissions, the paper states, "Capital costs for such procedural changes would be minimal; however, an increase in operating costs would be expected." Since ballasting and loading of vessels are among the largest sources of hydrocarbon emissions, the definition of BACT will determine the magnitude of development emissions and thus will have a substantial impact on the onshore air quality.

2. Bodega - The VOC emissions used in the modeling are 194 tons/year. Since the Bodega tracts are between 10 and 20 miles from shore, the allowable emissions from each development would be between 333 and 666 tons/year. Thus, the Bodega VOC emissions are below the exemption limit, and no mitigation will be required.

On the other hand, the modeling indicates that when the ozone concentration is 12 pphm, the Bodega emissions will increase the ozone concentration to 13 pphm, which is a violation of the federal ozone standard. From this example, it appears obvious that the DOI exemption limit is much too high to assure that the federal ozone standard will not be violated. Even the proposed exemption limits for California will not have any significant effect, since these limits would only reduce allowable emissions to a range of 153 to 306 tons/year. This result points out the absurdity of using annual emissions to exempt sources which affect a one-hour standard. In the case of Bodega, the maximum daily emissions are almost 20 times greater than the average daily emissions.

Although the air quality regulations have provisions to require mitigation of development emissions that would be exempt otherwise, the Director must first make a determination that project emissions

(individually or in conjunction with other emission sources in the area) will significantly affect onshore air quality. Since there are no guidelines as to what constitutes a significant effect or what information is required to make a determination, it is unclear whether the regulations would require mitigation of the Bodega emissions. Moreover, it appears that the Director's determination is optional rather than mandatory. Thus, even if the required information is submitted, the Director may refuse to make a determination, and no mitigation would then be required. The regulations also contain no requirement for the Director to review exempt sources. An affected state is allowed to provide information necessary for a determination, but it is unclear that the state would have the resources or the detailed project information required to demonstrate that an exempt development will significantly affect onshore air quality. This shifting of the responsibility from the applicant to the state of showing whether or not an air quality impact exists is totally inappropriate and will not protect onshore air quality.

3. Santa Maria - San Luis Obispo County is attainment for ozone, and northern Santa Barbara County has a request pending for redesignation as attainment for ozone. The Draft's modeling indicates that unmitigated OCS emissions will cause violations of the federal ozone standard. The only mitigation that positively will be required is BACT. As discussed above, it is unclear how much or even whether BACT would mitigate the projected adverse impacts on air quality. Moreover, although the regulations require an analysis of developments with emissions which "significantly affect" onshore areas to determine whether such emissions may cause a violation of the federal standards, this requirement does not apply to either oxides of nitrogen or VOC emissions in the context of ozone violations.

The proposed alternative measures for mitigating the air quality impact would delete tracts between 3 and 6 miles offshore. This would provide little in the way of mitigation, and more significant and substantive mitigation measures should have been discussed. The Draft did not

quality projections are based on the adoption of rules and regulations that will be or have been submitted for the State Implementation Plan (SIP). Since this plan is subject to change, and the quantified effect on ambient air quality of the new rules and regulations may be somewhat speculative, it appears more appropriate to use existing air quality data and existing emissions for baseline purposes.

Special Comments

1. On page 4-63 and 4-64, the TSP increases from OCS activities are dismissed as minimal. Yet, on page 4-67, the 24-hour TSP increases listed for three to five tract areas for the Lease Sale are in excess of the significance levels for the adopted air quality regulations; and increases for all five areas are in excess of the proposed California significance levels. This discrepancy should be corrected in the FEIS.
2. On page 4-72, the Draft claims that ozone increases from OCS activities in the Point Arena tracts would raise the ozone concentration to the maximum level permitted by the California State Standard of 10 pphm for 8 hours. There are two errors in this statement. First, the standard is 10 pphm for one, not eight, hours. Second, California standards are never to be equalled or exceeded, and thus the modeled concentration of 10.3 pphm violates the California Standard for ozone.
3. Again on page 4-72, the Draft states that emissions from OCS activities are not expected to significantly affect onshore visibility. However, no information is included in the Draft to substantiate this claim. Existing visibility, both onshore and offshore, should be discussed, along with an estimate of the degradation expected from OCS emissions and the basis for this estimate.
4. At the top of page 4-73, the Draft states that the air quality regulations require offsets for long term sources where the standards are exceeded. The Draft should have pointed out that offsets are only required where federal standards are violated, and no offsets are required if OCS emissions significantly impact areas exceeding state standards.

indicate that the exemption limits would allow an uncontrolled source to be twice as large at 6 miles from shore than if it is located 3 miles from shore. The supposed intent of this exemption formula is to allow uncontrolled sources to increase maximum onshore pollutant concentrations by the same amount an uncontrolled source 3 miles from shore would increase such concentrations. Thus, if this exemption formula scheme were correct, deleting tracts between 3 and 6 miles from shore would not guarantee that the maximum onshore impact would be reduced. In fact, our analysis indicates that the impact of the uncontrolled emissions from a source would increase significantly as it moves farther from the shore. (See Attachment)

It is also unclear that the deleted tracts will remain undeveloped. If an oil field is found to extend into this deleted zone, there may be strong pressures to lease the deleted tracts. If development in the deleted tracts are allowed, and emission points are required to remain 6 miles offshore, even greater onshore air quality degradation would occur than if these tracts had not been deleted.

Other mitigation measures should have been discussed in the Draft which would be more effective than the tract deletions. The Draft correctly points out that the tract deletion scheme would have little or no effect on ozone impacts. Mitigation measures would be substantially more effective than a tract deletion scheme if the emphasis is on emission reductions rather than dilution.

The Draft is inconsistent when it discusses the adverse impacts on air quality through tract deletions, while also repeatedly stating that the air quality regulations will provide adequate mitigation.

Although the Draft claims the air quality modeling results are for a worst case scenario, this does not appear to be the case. The mean, rather than maximum, resource estimates are used to estimate emissions for modeling purposes. In addition, existing ambient pollutant concentrations are projected to 1987, and such projections tend to reduce concentrations and minimize the impact of OCS emissions on standards violations. The 1987 air

Mr. Grant

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Recommendations

Prior to allowing any exploration or development on Lease Sale #53 tracts, a thorough analysis should be performed on the mitigating effects of the air quality regulations on Lease Sale emissions and resulting air quality degradation. This analysis should be submitted to all interested parties, allowing time for review, comments, and the development of appropriate mitigation measures which will become required conditions for the exploration and development of any OCS tract.

It is further recommended that all OCS developments be required to use pipelines to transport oil to shore, since the use of tankers and barges for oil transport is one of the major sources of OCS development emissions. The use of onshore facilities to store and treat oil should also be required in place of offshore storage and treatment (OS&T) facilities, since logistic, space and cost considerations often dictate the use of much less effective controls on OS&T emissions than would be the case for onshore facilities.

If you have any questions or if we can be of further assistance, please do not hesitate to call Don Koeberlein of my staff at (916) 322-9335.

Sincerely,

Gary Rubenstein/dp

Gary Rubenstein
Deputy Executive Officer

cc: State Clearinghouse
Gary Midkiff, OPR
Bay Area AQMD
Humboldt County APCD
Mendocino County APCD
Monterey Bay Unified APCD
Northern Sonoma County APCD
San Diego County APCD
San Luis Obispo County APCD
Santa Barbara County APCD
South Coast AQMD
Ventura County APCD
Beryl Reichenberg, Clean Air
Coalition of San Luis Obispo Co.
Mari Gottdiener, Coastal Commission
Jeff Gabe, Citizens for Better
Environment

Attachment



EDMUND G. BROWN JR.
GOVERNOR

State of California
GOVERNOR'S OFFICE
SACRAMENTO 95814

June 19, 1980

Chief, Conservation Division
U. S. Geological Survey
National Center, Mail Stop 600
Reston, Virginia 22092

Attention Environmental Analysis Section

Subject: California Comments on Proposed Air
Quality Rules for Oil and Gas Operations
on the Outer Continental Shelf

Gentlemen:

Enclosed are the State of California comments on proposed amendments to regulations governing air quality aspects of oil and gas operations on the Outer Continental Shelf.

These comments represent and incorporate the views of the following state and local agencies:

California Air Resources Board
Governor's Office of Planning and Research
California Coastal Commission Staff
Ventura County Air Pollution Control District
Monterey Bay Unified Air Pollution Control District
South Coast Air Quality Management District
San Diego Air Pollution Control District
San Luis Obispo County Air Pollution Control District
Los Angeles City Attorney's Office
City of Newport Beach

The State of California appreciates the action of the Secretary of Interior in extending the comment period on these amendments. This has enabled us to prepare a complete and coordinated presentation of our views.

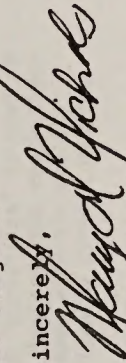
Chief, Conservation Division
U. S. Geological Survey
June 19, 1980
Page 2

Introduction

The interested state and local public agencies within California welcome this opportunity to comment on the proposed amendments to recently adopted final regulations governing air emissions from oil and gas operations on the Outer Continental Shelf (OCS) pursuant to the Outer Continental Shelf Act Amendments of 1978.

I wish to thank you in advance for full consideration of our comments on this most important subject.

Sincerely,



Mary D. Nichols
Special Assistant to the
Governor for Environmental
Protection

We appreciate the consideration given to our earlier comments, and to the unique conditions which exist on the OCS off California, in the development of the final regulations and the proposed amendments. However, we feel that there remain significant inadequacies in the approach adopted in the final regulations and the proposed amendments. We hope that these inadequacies will be remedied in the context of this proceeding on the proposed amendments.

In the preamble to the proposed amendments, the Department candidly states,

"We have concluded that, on the basis of existing information, we cannot yet determine whether the final air quality regulations would protect California's ability to attain more stringent state standards." 45 FR 15147.

An even stronger statement along the same lines, referring to both the proposed amendments and final regulations, is also contained in the preamble:

"... there is uncertainty about whether the approach outlined in the Department's proposed and final regulations will protect California's ability to achieve its more stringent state standards." 45 FR 15148; emphasis added.

We have determined that the proposed and final regulations will not protect California's ability to meet either state or federal ambient air quality standards. The most critical deficiencies in the regulations are that they do not base air quality determinations on the cumulative impacts of emissions from new and existing facilities; they adopt a test of "significance" that is totally inappropriate for the OCS off Southern California; and they establish "exemption formulas" which are far too broad and which exempt from air quality review projects which will have a significant impact on onshore air quality.

The demonstrable effect of these deficiencies is that the final and proposed regulations represent an unfortunate step backwards in terms of California's air quality. Major new facilities constructed off the California coast have agreed to emission levels far more stringent than those required by the regulations. These more stringent levels are required to protect California's ability to meet federal and state air quality standards; by requiring less, the regulations vitally undermine that ability.

Enclosure

The proposed amendments affect only those portions of the regulations relating to "exemption formulas" and "significance levels." They would leave unaltered the basic regulatory scheme and all the remaining provisions of the regulations. Our comments are focused primarily on the proposed amendments. However, since the effect of the amendments cannot be determined without reference to the remaining portions of the regulations, and since the degree of protection afforded California's air quality is a function of the entire set of regulations, our comments also address portions of the final regulations themselves. We incorporate by reference in these comments all previous California comments submitted in the development of the final regulations, and we request that these comments be considered in connection with the final regulations themselves, and that those regulations be reconsidered and amended in accordance with the views expressed herein.

Cumulative Impacts

The most basic and substantial defect in the final regulations and proposed amendments is that they do not protect onshore air quality from significant degradation caused by emissions from OCS operations. Such protection is clearly mandated by the Outer Continental Shelf Lands Act Amendments (OCSLAA), specifically Section 5(a)(8) which requires that the regulations provide:

"(8) for compliance with the national air quality standards pursuant to the Clean Air Act to the extent that activities authorized under this Act significantly affect the air quality of any State."

The intent of this provision is clear. As stated by Senator Muskie:

"In short, exploration, development, and production activities on the Outer Continental Shelf are no different than any other source of pollution; they are regulated to the extent they interfere with the efforts of a State to comply with the Federal mandate to clean up its air or to keep its air clean" (124 Cong. Rec. No. 133, Sections 13996-13997, August 22, 1978. emphasis added.)

The final regulations and proposed amendments contain central and interrelated provisions which render the regulations inadequate to carry out the literal requirements and the intent of the legislation. These provisions prescribe that a determination of whether OCS activities significantly affect onshore air quality shall be based on the impact of the emissions from a single project, rather than on a cumulative basis, and on whether such single source emissions will have a specified impact on onshore ambient concentrations (Section 250.57(e), (f)). By virtue of this approach, the regulations are totally inadequate to protect onshore air quality in nonattainment areas from further degradation caused by OCS emissions.

The approach that has been followed throughout this regulatory proceeding has been to analyze onshore impacts from OCS emissions on a project-by-project basis rather than cumulatively. The Department of Interior's proposed air quality regulations published in May, 1979, considered emissions only on a case-by-case basis and contained no provisions addressing the potential cumulative effects from multiple OCS emission sources. In its comments on the proposed regulations the State of California pointed out the adverse effects of the failure to address cumulative impacts, and urged that the final regulations remedy the deficiency. Although the Department has attempted to respond to the State's concerns by including a discussion of cumulative effects in the preamble, the provisions added to the regulations only authorize the Director of USGS to require additional information from the lessee either on his own initiative or upon request of the State. The Director does not appear to be empowered to require additional emission controls on such facilities to mitigate the cumulative impacts, nor do the regulations specify the degree of control to be required. Nevertheless, the Department states that it is their position that the information gathering provision "insures

that cumulative impacts of OCS facilities on the air quality of onshore areas will be identified and effectively controlled." (45 FR 15135). The regulations, however, retain the basic approach of case-by-case review; such an approach cannot and will not protect onshore air quality and is in conflict with the OCSLAA.

The statute provides that air quality standards must be met "to the extent that activities authorized under this Act significantly affect the air quality of any State." Section 5(a)(8), emphasis added. The statute contemplates and requires a comprehensive look at all OCS activities to make a determination of whether onshore air quality has been significantly affected. Congress was aware of the likelihood that OCS Projects would be numerous and substantial, and of the potential that such OCS development would have a detrimental affect on onshore air quality. Section 5(a)(8) is intended to preclude this result. It can do so only if the cumulative effect of OCS "activities" is used to determine the impact on onshore air quality. Instead, the regulations are written as if the statute requires compliance with air quality standards to the extent "any facility" significantly affects onshore air quality.

DOI adopted an exemption level which utilizes an emission rate distance formula allegedly "designed to insure that exempt OCS facilities will not produce onshore ambient air concentrations above the adopted significance levels" (45 FR 15130). Even assuming the adequacy of the significance levels to protect onshore air quality from adverse effects from any single project, DOI admits that there is no measure for additive consideration of impacts from a number of exempt sources. The Department states that:

"It is important to remember that an exemption level serves only as a screen to eliminate from review those sources which when considered alone will have no significant effect on the air quality of any onshore area." (45 FR 15130, emphasis added.)

The Department's approach to cumulative impacts stems from a factual analysis which, while it might be true for other parts of the country, certainly is not true for California.

"The Department's analysis of technical reports ... convinced us that, in certain infrequent instances, it is possible for emissions from OCS sources to interact in such a way as to increase notably onshore ambient air concentrations of pollutants. Spacing of facilities is such, however, that it would be unusual for this to occur." 45 FR 15135.

That cumulative impacts are either "infrequent" or "unusual" offshore California is simply not the case. The prevailing meteorological conditions off the California coast and the fact that several proposed and existing facilities will be in close proximity to each other will necessarily cause onshore air quality to be affected by the cumulative emissions from several facilities rather than simply emissions from a single facility. Therefore, cumulative impacts must be regulated; they cannot be dismissed, virtually out of hand, as is the case under the regulations.

The regulatory scheme lacks a mechanism to determine the overall effect upon onshore air quality of a number of platforms owned by different lessees and scattered throughout let us say the Santa Barbara Channel. DOI itself appears to acknowledge the problems that can be created by sole reliance upon a case-by-case review which considers neither the cumulative impacts of the emissions from a number of platforms each of which is either below the exemption level or within the significance level, nor the regionwide impacts of such emissions. In response to a comment that promulgation of the regulations required a regulatory analysis, DOI noted that:

"Failure to promulgate rules could have a major regionwide impact on state and local governments because a failure to adequately control air emissions could affect the eligibility of state and local governments to receive Federal financial assistance. The Clean Air Act requires that state and local governments achieve national ambient air quality standards by specific dates in order to maintain eligibility for specified Federal grants." (45 FR 15129)

Local air pollution control districts in California are developing and implementing air quality nonattainment plans pursuant to the directives of the Clean Air Act. Unfortunately, by a failure to consider the cumulative impacts of OCS emissions upon the ability of these regions to attain the air quality standards, DOI may be contributing to state and local governments' inability to achieve the standards and thereby continue to receive Federal assistance.

Under the regulations cumulative impacts will only be studied in exceptional instances. Instead of providing for their consideration in all cases, it is up to the Director to ask lessees to use cumulative models in their applications. There are no criteria for when the Director should request such cumulative modeling, there is simply a provision that he may ask for it if he wishes. (Section 250.34-3 (B)(1))

Similarly, otherwise exempt facilities will come under study for their cumulative impacts, only if:

"... the Director determines or an affected State submits information to the Director which demonstrates, in the judgment of the Director, that projected emissions from an otherwise exempt facility will, either individually or in combination with other facilities in the area, significantly affect the air quality of an onshore area, then the Director shall require the lessee to submit additional information to determine whether control measures are necessary. The lessee shall be given the opportunity to present information to the Director which demonstrates that the exempt facility is not significantly affecting the air quality of an onshore area of the State." Section 250.57-2(6)(f)

This section is built on a logical Catch-22. The cumulative impacts of an otherwise exempt facility are not studied unless there is information to show that they should be, yet where will this information come from if it is not submitted in the first place? Particularly, where is the State to obtain

information that an otherwise exempt facility should be studied for its cumulative impact when it does not have access to the emission information required by the Department? Finally, this section manages to shift the burden, as contemplated under the OCSLAA, from the Department to the State, by making no requirement that cumulative impacts be studied, but rather leaving their study to the option of the Director, acting either on his own or at the behest of the State.

The burden is shifted even more onerously on to the State in the case of already existing facilities. There, if the State can demonstrate to the Director that existing facilities, in their emissions, are having a significant impact on the State, then the Director may review it under the provisions for new facilities. The State is required to base its request on information from its own emission inventory.

These provisions essentially shift the fiscal burden for verifying cumulative OCS emission impacts from the lessee or the Department to the State or the local air pollution control agencies. Under the regulations, a State must demonstrate to the Director that emissions from an otherwise exempt facility will significantly affect the air quality of an onshore area; on such a showing the Director may require the lessee to submit additional information. Such provisions provide a direct impetus for the lessee and the Department to overlook cumulative impacts pending State or local agency modeling activities. In effect, this would shift the fiscal responsibility for adequately addressing adverse OCS air quality impacts from the lessee to the State or local APCD and shift the fiscal responsibility for adequately verifying and enforcing the regulations from the Department to the State or local agency.

Proper modeling studies are expensive. However in the usual case, the only adequate assurance of determining the cumulative impacts of OCS emissions is through such modeling. Cumulative impacts should not be discretionary; cumulative impact modeling must be an outright regulatory requirement with the burden placed on the source operator to demonstrate that all onshore impacts of OCS emissions, including cumulative impacts, are adequately addressed.

The failure of the regulations adequately to address cumulative impacts also conflicts with California's role under the federal Coastal Zone Management Act. In considering the consistency of OCS development and production plans with the Federally-approved California Coastal Management Program pursuant to Section 307 of the Coastal Zone Management Act, the California Coastal Commission will be guided by the State and local air pollution control agencies' assessment of impacts on the ability of the State to attain more stringent state standards and assure effective implementation of the nonattainment plans. Section 30253(3) of the California Coastal Act, the foundation of the CCMP, requires that new development "be consistent with requirements imposed by an air pollution control district or the State Air Resources Board as to each particular development." In addition, Section 30250(a) of the Coastal Act provides in part that:

New ... industrial development ... shall be located ... where it will not have significant adverse effects, either individually or cumulatively, on coastal resources. (emphasis added).

Accordingly, in conducting consistency review of OCS plans, the Coastal Commission will rely upon the advice of the Air Resources Board and the local air pollution control districts in assessing the cumulative impacts of emissions from activities on the OCS. Unless the Department's regulations also address cumulative impacts, a gross inconsistency will be created in the Department's coastal regulatory program.

A specific example of the deficiency in the regulations stemming from their failure adequately to address cumulative impacts is illustrative. Current estimates are that the Santa Barbara Channel, when fully developed, will have 10 to 20 oil and gas production platforms. Although it is difficult to estimate emissions from a "typical" platform, an examination of the environmental documents for recent projects in the Channel indicates that a reasonable estimate for platform emissions might be 50 tons per year of volatile organic compounds (VOC) and 100 tons per year of nitrogen oxides (NOx). On the basis of the location of tracts leased in the Channel, it seems reasonable to assume that most of the platforms will be located 7 to 12 miles from shore. Therefore, most of the platforms would be exempt from further review under the exemption formulas proposed for California. (All the platforms would be exempt under the exemption formulas in the promulgated regulations.)

The two counties directly adjacent to the Santa Barbara Channel, Santa Barbara County and Ventura County, are both nonattainment areas for the federal ozone ambient air quality standard. As a result, both counties have prepared the Air Quality Management Plan; and, based on an analysis using the EKVIA modeling techniques, both counties have estimated the total annual emissions of VOC and NOx that can be accommodated in the counties consistent with attaining the ozone standard. It is estimated that the southern coastal section of Santa Barbara County can accommodate no more than 3,700 tons per year of VOC and no more than 5,500 tons per year of NOx. The estimates for the southern half of Ventura County are 11,600 tons per year of VOC and 12,800 tons per year of NOx.

Continuing the example, the available meteorological data indicate that, under the meteorological conditions associated with smog formation in the region, emissions in the Santa Barbara Channel are carried onshore into Santa Barbara and Ventura Counties within the time frame normally associated with photochemical reactions. Thus, it seems very possible that most of the 10 to 20 potential platforms in the Santa Barbara Channel would be exempt from control under the promulgated, and proposed, OCS air quality regulations. Yet these platforms, cumulatively, would be adding 500 to 1,000 tons per year of VOC and 1,000 to 2,000 tons per year of NOx to the total air pollution burden in Santa Barbara and Ventura Counties. For Santa Barbara County, this potentially represents 13 to 27% of allowable VOC emissions and 18 to 36% of allowable NOx emissions. For Ventura County, this potentially represents 4 to 9% of allowable VOC emissions and 9 to 17% of allowable NOx emissions. Thus, there is a very large potential in the Santa Barbara Channel for a significant cumulative effect of OCS emissions on onshore air quality.

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The problem of cumulative effects is currently and will continue to be an issue in California. The California air pollution control agencies believe, therefore, that the problem should be addressed now rather than after development has occurred. If the issue is not addressed until after substantial development has taken place, there will be little choice but to retrofit existing platforms, which may be difficult due to physical space problems, or to limit oil and gas production. Neither of these alternatives is desirable.

Despite the demonstrated importance of cumulative impacts the regulations treat them as unimportant and unworthy of study except in the most unusual circumstances. At the very least, information on cumulative impacts should be required in all cases. We urge as a positive approach to the cumulative effects issue that all new facilities within some boundary line (such as the California Coastal Waters) to be required to employ BACT. Such an approach should also require emission tradeoffs when a fixed emission rate within the boundary is exceeded. Unless the issue of cumulative effects is dealt with adequately, the regulations, regardless of any other provisions they contain, will be inadequate to meet the mandate of the statute to protect onshore air quality.

Significance Levels

The final regulations establish so-called "significance levels" based on federal standards for criteria pollutants (Section 250.57-1(e)). The proposed amendments follow the principle of the final regulations, but determine "significance" with respect to California instead of federal standards for sources located off the coast of California. Regardless of whether reference is to the federal or California standards, the principle underlying the determination of "significance" is fatally flawed.

The Congressional conference committee report on Section 5(a)(8) calls for the air quality regulations to apply when a "determination is made that offshore operations may have or are having a significant effect on the air quality of an adjacent shore area, and may prevent or are preventing the attainment or maintenance of the ambient air quality standards of such area ...". In those cases the regulations are "to assure that offshore operations conducted pursuant to this act do not prevent the attainment or maintenance of those standards." H.R. Rep. No. 95-1474, 95th Cong., 2d Sess. 85 (1978) reprinted in [1978] U.S. Code Cong. & Admin. News, 1684. The juxtaposition of "significant effect" and language assuring the maintenance or attainment of air quality standards suggests that "significance" includes something less than those activities which directly and dramatically affect onshore air quality. Case law on interpretations of similar wording in similar environmental legislation gives an even stronger indication that "significance" here must be given a broader interpretation.

The United States District Court in the District of Columbia, has interpreted the phrase "significantly affecting the quality of the human environment," key language in the National Environmental Policy Act. The Court decided the phrase "can be construed as having an

important or meaningful effect, direct or indirect, upon a broad range of aspects of the human environment." National Resources Defense Council, Inc. v. Grant (1972) 341 F. Supp. 356, 367. Shortly thereafter, the Court expanded on its definition, saying, "[t]he phrase must be broadly construed to give effect to the purposes of the NEPA. A ripple begun in one small corner of an environment may become a wave threatening the quality of the total environment. Although the thread may appear fragile, if the actual environmental impact is significant, it must be considered." Citizens Organized to Defend the Environment, Inc. v. Volpe (1972) 353 F. Supp. 520, 540.

It is California's position that in view of the Clean Air Act mandate that primary ambient air quality standards be attained in each area of the state as expeditiously as practicable, Section 110(a)(1), (a)(2)(A), any increase of a nonattainment pollutant in a nonattainment area must be considered "significant" within the meaning of the CAA and the OCSLAA; therefore, any OCS emissions of nonattainment pollutants or their precursors which will be transported onshore should be completely offset, reduced, or controlled.* This interpretation seems appropriate not only in the case of Southern California, a region whose air quality problems are known to be the worst in the nation, but in the case of all nonattainment areas in California.

Coastal area nonattainment plans (NAPs), prepared in accordance with Title 1, Part D of the Clean Air Act, did not consider OCS emissions when the respective NAP emission inventories were developed. Most of the coastal NAPs cannot demonstrate attainment of the National Ambient Air Quality Standard (NAAQS) for ozone. If the NAPs do not demonstrate attainment without considering OCS emissions, they cannot possible demonstrate attainment if such emissions are considered. Thus, all OCS nonattainment pollutant emission impacts within a nonattainment area will be significant. Furthermore, without full reduction or mitigation of the emissions, the impacted air basin population and the respective air basin industries must pay the associated costs by further reducing the air basin emissions in order to allow for the impacts of inadequately controlled OCS emissions. Thus the proposed significance levels may well prevent the attainment of federal standards in accordance with EPA-approved nonattainment plans, or alternatively, may prevent or greatly reduce the potential for onshore growth.

*We would of course have no objection to a reasonable threshold limitation such as that contained in onshore new source review rules for construction of major sources of emissions. While emissions from onshore sources below such thresholds need not be completely offset, they must be minimized; moreover, they are accounted for in the state implementation plan and are offset by other emission reduction measures identified in the applicable control strategy.

Instead of formulating an approach which does not interfere with state efforts to attain state and federal air quality standards, the regulations reduce the determination of "significance" to an arbitrary mathematical formula. The regulations' determination of "significance" rests on whether or not an offshore source will increase ambient onshore concentrations of any pollutant by approximately 2% of the air quality standard. This determination is directly derived from EPA's "Emission Offset Interpretive Ruling," 44 FR 3282, January 16, 1979. According to the preamble to the final regulations:

"EPA encounters an analogous situation where emissions from new sources locating in "clean" areas may adversely affect a nonattainment area. To address this situation EPA established a set of significance levels and stipulated that if the emissions from the new source locating in the "clean" area would cause ambient air concentrations in excess of these levels in the actual area of nonattainment, mitigation measures are necessary. Because the onshore situation for which the EPA significance levels were designed is similar to the offshore situation, the levels have been incorporated into this regulatory program." 45 FR 15131.

Contrary to the above statements, neither the situation addressed by the EPA ruling nor the requirements of the ruling itself are analogous or otherwise appropriate for application in regard to OCS activities.

First, while the EPA ruling addresses emission sources located in a "clean" or attainment area, the OCS off the coast of Southern California exceeds federal standards for several pollutants, and hence would be classified as a nonattainment area. (This is documented in "Review of Air Quality Data for OCS Off Southern California," attached hereto as Attachment A.)

The significance of this vital difference should be obvious.

The EPA ruling addresses the impact of air from a "clean" area on air quality in a nonattainment area. In this situation, the concentration of pollutants in the air from the clean area must always be below the federal standards. If it exceeded the federal standards, the area would be nonattainment (CAA Section 107). Thus in the situation addressed by EPA, the air transported into the nonattainment area cannot, in and of itself, cause a violation of standards. The contrary is true of the South Coast OCS. Due to massive sources already in operation on the OCS and the accumulation of pollutants transported from onshore sources, concentrations exceed federal standards on the OCS, and when this air mass is transported onshore, it can in and of itself lead to exceedances of federal standards.

It is also clear under the EPA ruling that, since the area in which the source is located is attainment, the cumulative emissions from all sources in the area taken together do not exceed applicable standards. Because of the absence of a cumulative approach in the regulations, this is not the case with OCS sources.

Perhaps even more significant is the difference between the effect of a determination of significance under the EPA ruling and under the OCS regulations. Under the EPA ruling, if a major source located in a "clean" area is determined to have no significant impact on a nonattainment area, the source will not be required to fully offset its emissions, but it will be required to employ BACT. However, under the OCS regulations, a source whose emissions do not exceed the significance levels set forth in the regulations need not apply any controls at all. Thus, a far higher level of emissions is permitted from an OCS source which does not exceed significance levels than from such a source in an onshore attainment area.

In sum, the EPA formula for determining significance levels applies to the emissions from sources located in areas where air quality, determined on the basis of all emissions in the area, meets applicable standards, and exemption under the formula does not eliminate the need for the source to employ BACT. In contrast, the significance level determination in the OCS regulations applies, in Southern California at least, to sources located in areas where federal standards are exceeded; it fails to take cumulative impacts into account; and it can result in a total absence of controls on a major source. These differences render application to OCS activities of the significance level determinations developed by EPA totally inappropriate, unsupportable, and arbitrary.

Exemption Formulas

The proposed and final regulations contain exemption formulas for individual facilities based on the level of emissions and distance from shore. An exempt facility is not subject to air quality review. In concept, the proposed and final exemption formulas are identical; the proposed formula is however more stringent than that contained in the final regulations. In our view, the exemption formulas are inadequate in both the final and proposed versions.

The most significant deficiencies in the exemption formulas are that they are based on the incorrect premise that there is a linear decrease in onshore pollutant concentrations based on distance from shore of an emissions source and that their application will result in the exclusion from air quality review of sources which will produce onshore concentrations above the significance levels specified in the regulations.

The exemption formulas contained in the proposed amendments are based on the concept that the further from shore the emissions originate, the less their impact* on shore will be. This is demonstrably not the case.

*As is discussed elsewhere in these comments, a determination of significance levels based solely on the effect of a single source on ambient onshore concentrations is invalid.

The staff of the Air Resources Board has performed a detailed modeling study* which demonstrates that under most meteorological conditions there will be greater onshore ground level concentrations of criteria pollutants from a source located ten miles offshore than from a similar source with one-half the emissions located five miles offshore. This undercuts the basic premise underlying the exemption formulas - namely, that onshore concentrations decrease in linear fashion as distance from shore increases.

Of even greater significance, the Air Resources Board modeling study also demonstrates that the exemption formulas do not achieve the purpose for which they are intended. The preamble to the final regulations states that the exemption formulas are designed "to insure that exempt OCS facilities will not produce onshore ambient air concentrations above the adopted significance levels." 45 FR 15130. In fact the proposed exemption formulas exempt from review projects which will exceed the onshore significance levels contained in the proposed amendments.

The study shows that a facility exempt from air quality review under the proposed exemption formulas could nevertheless produce onshore pollutant concentrations in excess of the significance levels contained in both the final and proposed regulations. Any exemption formula which totally insulates from air quality review projects which will substantially affect onshore air quality is both arbitrary and inconsistent with the requirements of OCSLAA and must be rejected.

The preamble to the final regulations states, "In developing the exemption formulas, the GS assumed source characteristics and meteorological conditions similar to those on the OCS." 45 FR 15130, emphasis added. In fact, meteorological conditions off Southern California are unique, in that virtually all emissions within seventy miles of the coast are transported onshore, regardless of where in the seventy mile range they originate. (See comments submitted July 23, 1979.) Therefore, an exemption formula applicable to Southern California which discounts the emissions from a facility based on the distance the facility is from the shore is totally arbitrary.

The preamble to the final regulations also contains a statement from the House Conference Report to the effect that when an OCS activity "is located many miles from the coast" it is presumed to have no significant impact onshore. 45 FR 15131. While this may be true in other areas, it is not the case off California, and the statement in the Conference report cannot justify an exemption formula which ignores California's meteorology.

A further deficiency in the distance based exemption formula is that it is without any factual support insofar as VOC emissions are concerned. It is well established that VOC emissions generally have maximum impact on

*This study, "Modeling Study Regarding Exemption Formulas in Regulations Governing OCS Operations" is included as Attachment B hereto.

ozone levels dozens of miles away from the source.* Therefore, even if distance based exemption formulas were supportable with respect to any other pollutants, they clearly are not for VOC. Instead, a uniform level should be established for VOC emissions, regardless of the distance from shore of the source.

There are additional deficiencies in the exemption formulas. First, the exemption level is expressed in tons per year of emissions, rather than on a daily basis. This annual limitation is inconsistent with the exemption provision of the South Coast Air Quality Management District's New Source Review (NSR) rule, and is inadequate to protect federal and California standards which are based on averaging times less than one year, i.e. one to twenty-four hours.

In apparent awareness that the exemption provisions of the South Coast NSR rule are based on daily emissions, the preamble to the proposed amendments states that the exemption level under Rule 213 of the SCAQMD is "roughly equivalent" to 40 tons per year, 45 FR 15148. In fact the exemption level in Rule 213 is stated in pounds per day rather than tons per year. This is also the case with the District's Regulation XIII, which has superseded Rule 213, and the model New Source Review rule approved by the ARB in February, 1979.** The expression of emission limitations on a daily instead of an annual basis is consistent with the fact that federal and California standards for ozone (oxidant), carbon monoxide, sulfur dioxide, and particulate matter, and the California standard for nitrogen dioxide, are all expressed in averaging times ranging from one to twenty-four hours. The daily emissions limitations in California's NSR rules are presumptively adequate to protect these standards.

This is clearly not the case with exemption formulas based on an annual average. A source which is below the exemption level specified in the proposed amendments may operate less than the entire year, e.g. three months only. In that period, its emissions may have a greater effect on onshore ambient concentrations than is specified in the significance levels established in the regulations but, under the existing regulations and

*Department of Interior, POCs Reference Paper No. 53-5, "Air Quality Impact of Proposed OCS Sale, No. 53 Offshore Central and Northern California," March 1980, Figure IV-10, page IV-28, Table VI-6, page VI-35. See also, "The Area Representativeness of Air Monitoring Stations -- Fresno Study Phase I (Oxidant)," State of California Air Resources Board, March 1977, Attachment C hereto. See also, "Review of Air Quality Data from OCS Areas Off Southern California," Attachment A hereto.

**Copies of South Coast Air Quality Management District's Regulation XIII, and the ARB model NSR rule are attached hereto as Attachments D and E, respectively. Regulation XIII has been submitted to EPA for inclusion in the State Implementation Plan.

proposed amendments, the source would nevertheless be exempt from an air quality review. An analysis of an actual offshore project near Bodega Bay, California, described in Department of Interior, POCS Reference Paper No. 53-5, Air Quality Impact of Proposed OCS Sale, No. 53 Offshore Central and Northern California, March 1980, demonstrates this result. The VOC emissions from the facility are 194 tons per year. Since the Bodega tracts are between 10 and 20 miles from shore, the allowable emissions for each development would be between 333 and 666 tons per year under the exemption formulas contained in the final regulation. Thus, the Bodega VOC emissions are below the exemption limit, and no mitigation will be required. On the other hand, the maximum daily emissions are almost 20 times greater than the average daily emissions. Modeling indicates that for a day when onshore ozone concentrations are 12 ppm, there will be an increase to 13 ppm due to the Bodega emissions, and thus these emissions will cause violations of the federal ozone standard, even in the case where this standard would not otherwise be violated. Even the proposed exemption limits for California will not necessarily prevent this result, since these limits would only reduce allowable emissions to a range of 153 to 306 tons per year, and hence would exempt the 194 tons per year source.

Moreover, the exemption level in the SCAQMD NSR rule has been reduced from the 250 pounds per day contained in Rule 213 to 150 pounds per day in the rule currently in effect, Regulation XIII. Since the exemption formulas in the proposed amendment to the regulations are based on the superseded 250 pounds per day limit in Rule 213, it should be revised significantly downward to be consistent with the current limitation of 150 pounds per day.

For all the above reasons, the proposed and final exemption formulas are invalid and should be either significantly revised or totally discarded.

The inadequacy of the regulations, by virtue of their approach to cumulative impacts, significance levels, and exemption formulas, to protect California's air quality is not hypothetical but is clearly evidenced by an examination of emissions from and controls on existing OCS facilities. A summary* of existing facilities on the OCS off California demonstrates not only that their cumulative emissions do indeed have a substantial impact on portions of California's coastal counties, but also that these facilities, were they to be constructed now or as existing sources, would not be subject to any mitigation measures under either the final or proposed regulations.

The summary demonstrates that the combined onshore impact of emissions from existing OCS sources constitutes six percent of total NOx emissions in the impacted portion of Santa Barbara County and forty percent of VOC emissions in the impacted portion of Ventura County. Despite these substantial contributions to onshore pollution, emissions from these

*Summary of Existing OCS Facilities Re: Onshore Impact of Emissions; and Controls Required Under OCS Regulations, included as Attachment F hereto.

facilities are not required to be mitigated, and if constructed today at present operating levels, they would also be exempt from controls under the regulations.

Even more indicative of the regulations' failure to provide adequate protection for California's air quality is the fact that three major new OCS facilities have actually agreed to achieve a far higher level of emission controls than are required under the final regulations and proposed amendments. Emissions from the facilities in question, large drilling and production platforms operated by Shell Oil Company, Chevron, and Exxon Corporation, have been reviewed and summarized.*

Shell and Chevron have agreed to full mitigation of all emissions; Exxon has agreed to substantial mitigation. Exxon's level of mitigation exceeds by a factor of up to 10 the mitigation required under the final regulations and proposed amendments, which would hence permit an increase of hundreds of tons per year of pollutant emissions. Thus, the regulations will not protect California's air quality, but will instead represent a significant step backward in California's efforts to control air pollution.

Lack of Adequate Protection for State Standards

The proposed revisions to the recently adopted DOI air quality regulations for OCS development were purportedly developed to protect California air quality standards, in recognition of the fact that the adopted regulations may not protect California's ability to achieve more stringent state standards. However, an analysis of the proposed revisions indicates that, although they represent some limited improvement over the adopted regulations, they are totally inadequate to assure that state air quality standards will be achieved and maintained.

Under both the final regulations and proposed amendments, if a project exceeds both the emission exemption level and significant impact level, tradeoffs would only be required in the vicinity of an area where the federal standard has not been attained. In the vicinity of unclassified or attainment areas, only BACT would be required, even if state standards are violated. For many projects and pollutants, it is possible that BACT would be determined to be no significant mitigation whatsoever, due to difficulties with costs, logistics, and availability of pollution control equipment for offshore sources.** If a project affects an attainment

*Comparison of Actual Emission Reduction Controls with Emission Reduction Controls Required Under OCS Regulations for Three Major OCS Facilities, included as Attachment G hereto.

**Since, as discussed elsewhere in these comments, there are no standards or limitations governing the Director's case-by-case determination of BACT, this result is all the more likely.

or unclassified area, the proposed regulation does not require any tradeoffs, so that the project emissions could easily cause or exacerbate a violation of state standards. In such situations, the regulations afford no protection at all for California's standards.

To illustrate that it is not unusual or rare for California coastal areas to be attainment for federal standards but "nonattainment" for state standards, the following examples were found:

- a) Most areas in the North Coast Air Basin are attainment for TSP or are proposed as attainment for TSP. Yet, all of these areas record violations of the state air quality standard for TSP.
- b) The San Francisco Bay Area Air Basin is attainment for NO₂ and SO₂, and has been proposed as attainment for TSP. State standards for all three pollutants are violated in the air basin.
- c) The North Central Coast Air Basin is attainment for TSP, but violations of the state TSP standards are recorded.
- d) San Luis Obispo County has been proposed as an attainment area for ozone, but violates the state oxidant standard.
- e) Part of Santa Barbara County is attainment for TSP, but violates the state TSP standard.
- f) Ventura County is attainment for NO₂, but violates the state NO₂ standard.
- g) The South Coast Air Basin is attainment for SO₂, but violates the state SO₂ standard.

In addition, the North Central Coast Air Basin exceeds the state 24-hour SO₂ standard, but since this standard involves threshold concentrations for both SO₂ and TSP and TSP is not measured near the SO₂ monitoring site, a violation of this state standard has not technically been recorded.

Besides a lack of protection for state standards that are more stringent than federal standards, the DOI regulations totally ignore state standards for non-criteria pollutants. In California, there are state standards for sulfate, ethylene, hydrogen sulfide, and visibility, but there are no corresponding federal standards.

Perhaps the most critical of these non-criteria pollutants is sulfate. State sulfate standards are approached in the San Francisco Bay Area and Santa Barbara County, and are exceeded in Ventura County, the South Coast Air Basin, and San Diego County. Since SO₂ is a precursor to sulfate, and all of the above areas are attainment for SO₂ (and in several cases are also attainment for the state SO₂ standards), the proposed regulations would not require tradeoffs and thus the attainment and maintenance of the state sulfate standard could be seriously affected.

The proposed regulations also do not take into account precursor relationships. As stated above, SO₂ is a precursor of sulfate and TSP. Similarly, NO_x is a precursor of ozone and TSP. There are ozone and TSP air quality problems along most of the California coast, but federal SO₂ standards are not violated while federal NO₂ standards are violated only in the South Coast and San Diego Air Basins. Since the proposed regulations do not require the impact of SO_x and NO_x emissions on ozone and TSP concentrations to be addressed, these regulations are seriously deficient in protecting onshore air quality standards for both ozone and TSP.

Exclusion of State and Local Air Quality Agencies from Review of Air Quality Aspects of OCS Projects

Insofar as proposed new facilities are concerned, the only provision for State participation in the air quality review process is found in Section 250.57-1(j), relating to review of exempt facilities. This section puts the burden on a State to demonstrate that emissions from a facility, either individually or in combination, will significantly affect onshore air quality. It makes no provision for the Department to consult with State or local agencies in connection with proposed new facilities. Instead, the regulatory approach is for the project proponent to supply its own analysis of all air quality issues, and for the Department to make the required determination on the basis of the data supplied.

It is the position of air quality regulatory agencies in California that, at the very least, consultation with State and local air quality agencies should be required. It is often the case that the data supplied by project proponents will be inaccurate in significant respects. This is no mere speculation, but is borne out by numerous instances in California. Three instances of such inaccuracies in connection with California oil and gas projects are documented in "Review of Accuracy of Air Quality Data Provided in Connection with Construction of Three Major Emitting Facilities," as Attachment H hereto. State and local air quality agencies are uniquely qualified to analyze air quality data submitted by project proponents; this expertise presumably does not exist in the Department of Interior. Therefore it is arbitrary and capricious to place on State and local air quality agencies the burden of obtaining and producing information to demonstrate a significant onshore air quality impact, and in the absence of their meeting such a burden, to exclude them from the review process.

Effect of Senate Bill 815 and Coastal Waters Definition

The preamble to the proposed amendments raises two questions which we feel we are uniquely able to answer. The first relates to "how Senate Bill 815 ('SB 815') effects [sic] the ability of the state to create more stringent state standards and the ability of the Department to incorporate such standards in its regulatory program."

SB 815 amended Section 39602 of the California Health and Safety Code by adding the following provision:

"Notwithstanding any other provision of this division, the state implementation plan shall only include those provisions necessary to meet the requirements of the Clean Air Act."

This section leaves in tact the ability of the California Air Resources Board to adopt more stringent state standards and decreases neither the ability nor the responsibility of the Department to incorporate California standards into its regulations.

The authority of the ARB to adopt state ambient air quality standards is found in Health and Safety Code Section 39606, which provides, "The state board shall: ... (b) Adopt standards of ambient air quality for each air basin in consideration of the public health, safety, and welfare, including but not limited to, health, illness, irritation to the senses, aesthetic value, interference with visibility, and effects on the economy." Under Health and Safety Code Section 40001, local air pollution control districts are required to "adopt and enforce rules and regulations which assure that reasonable provision is made to achieve the state ambient air quality standards...." SB 815 did not affect either directly or by implication these two basic provisions. Therefore, California's ambient air quality standards and the ability of the State Air Resources Board to adopt, revise, and enforce such standards remains fully effective.

Nor has SB 815 affected the responsibility and ability of the Department to protect California's standards in its OCS regulations. The view has been expressed that insofar as SB 815 precludes inclusion of California's ambient air quality standards in the SIP, it also prevents incorporation of California's standards in the Department's regulations. This view is inconsistent with the intent of the Outer Continental Shelf Lands Act, the Clean Air Act, and SB 815; it is totally without merit and should be rejected.

The basic policy of the Outer Continental Shelf Lands Act is clearly stated:

1332. NATIONAL POLICY FOR THE OUTER CONTINENTAL SHELF. -- It is hereby declared to be the policy of the United States that --

X X X X

(3) The outer Continental Shelf is a vital national resource reserve held by the Federal Government for the public, which should be made available for expeditious and orderly development, subject to environmental safeguards, in a manner which is consistent with the maintenance of competition and other national needs;

X X X X

(5) the rights and responsibilities of all States and, where appropriate, local governments, to preserve and protect their marine, human, and coastal environments through such means as regulation of land, air, and water uses, of safety, and of related development and activity should be considered and recognized. (Emphasis added.)

In light of this explicit language, particularly the reference in Section 1332(5) to the right of states to preserve and protect their environment through regulation, it is difficult to see how the view can be maintained that the Department does not have the ability, not to mention the responsibility, to protect state ambient air quality standards.

The Clean Air Act also explicitly recognizes the authority of the states to control air quality independent of federal authority. Section 116 of the Clean Air Act states that:

"nothing in this Act shall preclude or deny the right of any state or political subdivision thereof to adopt or enforce (1) any standard or limitation respecting emissions of air pollutants or (2) any requirement respecting control or abatement of air pollution; ..."

It is thus the explicit policy of both the Clean Air Act and the Outer Continental Shelf Lands Act that a state's right to adopt regulations to protect its air quality is recognized and preserved.

In light of this policy and of the explicit recognition in Section 116 of the Clean Air Act of the states' ability to adopt their own emission limitations and standards, the reference in Section 5(a)(8) of the OCSLAA to "national ambient air quality standards pursuant to the Clean Air Act" must be read to include state ambient air quality standards. Any other reading would mean that Congress intended to deprive the states of their basic right to protect their own environment. In both the Clean Air Act and OCSLAA Congress has explicitly disavowed such an intent. Therefore, the Department has the clear ability and responsibility to preserve and protect California's ability to attain and preserve its ambient air quality standards.

Insofar as SB 815 may be relevant to this question, it is anomalous if not totally absurd to think that the California legislature, by limiting the provisions that may be included in the SIP, intended to also prevent the Department from protecting California's ambient air quality standards. Such a result is totally inconsistent with California's long-standing and comprehensive air regulatory program; it should be rejected out of hand.

The preamble to the proposed amendments also states that the status of California's definition of "California coastal waters" is indefinite because the California Air Resources Board on December 6, 1979, requested that EPA defer consideration of an amendment to the California State Implementation Plan which would have incorporated a provision defining "Southern California Coastal Waters." The December 6 letter was not based on any uncertainty in the definition of California coastal waters, but was rather intended to allow revision of the New Source Review rule of the SCAQMD regarding the applicability, not the substance of the definition of Southern California Coastal Waters.

In fact, revisions to the rule were adopted March 7, 1980. These revisions made no change whatever to the definition of California coastal waters (See Section 1302(f)), and on April 3, 1980, the rule was submitted by the California Air Resources Board to the Environmental Protection Agency for inclusion in the State Implementation Plan.* The definition of California coastal waters found in the South Coast District's rule is consistent with the definition of California coastal waters contained in the New Source Review rule of the other coastal districts within California. Therefore, the Department may proceed on the basis of California's definition of its coastal waters.

Definitions

1. "Air Pollutant" - Section 250.2(tt)

We are concerned with the obvious inconsistency and leniency of the definition in the regulations in contrast to that currently in use by many California air pollution control districts. The definition in the regulations addresses only the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. However, the California Air Resources Board has set State Ambient Air Quality Standards which in many cases are more stringent than those established by EPA. The State Board has set these standards based on existing scientific data available and in conjunction with California's unique air pollution problems. Standards have also been set for pollutants for which no federal standards exist, such as sulfates and hydrogen sulfide.

In addition, many local districts, as well as the State Board, recognize the precursor relationships of nitrogen oxides in ozone and particulate nitrate formation and sulfur dioxide in sulfate formation. As such many local districts require emission offsets for these emission increases which exceed new source review criteria levels. Thus it is imperative that the proposed definition include both the recognized precursor relationship and the State Ambient Air Quality Standards within the regulatory framework. Not to do so will place an additional burden on existing and new onshore sources in order to insure that all statutory requirements will be met.

2. "Ambient Air" - Section 250.2(aa)

The definition of ambient air is limited to areas "to which the general public has access." We are concerned that this is overly restrictive, in that emissions and their impacts on large areas of fenced industrial land are excluded from appropriate mitigation and control requirements:

*A copy of the revised rule is included as Attachment D hereto.

We recommend the following definition: "Ambient air" means that portion of the atmosphere that envelopes or surrounds the earth. Where air contaminants are emitted into a building or structure not designed specifically as a piece of air pollution control equipment, such emission into the building or structure shall be considered an emission into the ambient air.

3. "Best Available Control Technology (BACT)" - Section 250.2(mw)

The definition of BACT contains absolutely no criteria or standards to guide or limit the Director in making his case-by-case determinations. In the absence of such criteria or standards, the definition provides no assurance whatever that emissions controls will be adequate.

4. "Facility" - Section 250.2(zz)

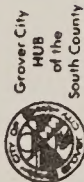
The definition of facility proposed does not specifically address tanker transportation emissions. The definition should include all tanker emissions associated with a platform, from the time the tanker leaves the platform to the time the respective oil cargo is off-loaded.

5. "Temporary Facility" - Section 250.2(fff)

We believe the definition is far too broad. If temporary facilities are to be treated separately, they should be limited to facilities for exploration only, and the duration should be substantially less than three years, perhaps one year at a maximum.

Mayor - Robert H. Newdell
Mayor pro tem Juanita Qualls
Councilman Alfred C. Davis
Councilman Jack Egan
Councilman Woody Lynn
City Administrator - Arnold Dondy

City of Grover City



June 27, 1980

Mr. John Lane, Environmental Assessment Manager
U. S. Department of Interior
Bureau of Land Management
Pacific Outer Continental Shelf Office
1340 West Sixth Street, Room 200
Los Angeles, California 90017

RE: Comments on the Draft Environmental Impact Statement for OCS Lease Sale #53

Dear Mr. Lane:

Thank you for allowing the City to review the Draft Environmental Impact Statement for OCS Lease Sale #53. The City would offer the following comments and recommendations:

In many instances there are statements in this DEIS which appear to justify the project. For example, on page 4-183 it states that "there will be no cumulative offshore impacts from platforms since there are no platforms in the Sale #53 area." This statement does not recognize the cumulative impacts the OCS activities will have when combined with the already existing level of pollutants in the San Luis Obispo County Air Basins. Another example on the same page is "the only significant increase in cumulative impacts from spilled oil would occur in San Miguel Island." What of the cumulative impacts the projected 2.29 oil spills of over 1000 barrels might have should the spills occur within a short period of time (perhaps a year) of one another? The FEIS should address all possible impacts in an impartial, factual and complete manner.

The major faults with this DEIS result from the lack of data necessary to adequately address the impacts to our area. From the very beginning of the BLM review, the primary concerns of the citizens of this area have included maintenance of the air quality, oil spill protection for recreational resources, marine mammals and commercial fishing, and socio-economic impacts. It is astounding to find BLM attempting to complete the EIS process prior to availability of strategic information. The environmental studies regarding marine mammals and seabirds, geohazards, the oceanographic and meteorological study of offshore California, conflicts of space and facilities use between the fishing industry and OCS activities, and the risk assessment for coastal areas must be completed and utilized in the compilation of the Final Environmental Impact Statement for the development of meaningful mitigation measures.

The quality of the oil spill analysis has not improved over that in the preliminary Draft EIS. Still lacking is data regarding near-shore currents

Mr. John Lane
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June 27, 1980

which possess characteristics highly different from those of the California and Davidson currents, some thirty miles offshore. Impacts of oil spills of less than 1000 barrels are completely lacking and there is no discussion of the impacts of chronic spills. The analysis remains highly deficient.

In fact, it is highly questionable at this time as to whether the best available technology for cleanup and containment operations is even capable of containing an oil spill in seas and bays with characteristics similar to those off the Central California Coast. As stated in the Summary of Knowledge, completed by the BLM in April, 1980, the Central California Coast has seas of over four feet seventy percent of the year. In the FEIS for the National Five-Year Plan it states that containment attempts are effective twenty percent of the time in seas of five to six feet. In an Office of Planning and Research document (State of California-1977) on Offshore Oil Drilling it states that in water currents exceeding one to two knots, generally found in restricted bodies of water, boom containment methods would not be effective. The general velocity of the current in Estero Bay is four knots (U.S. Coast Guard spokesman, personal communication). In addition, the study states that in sea conditions with breaking waves of less than three feet, boom containment may be ineffective (pp 433-435). The U.S. Coast Guard in testimony before the House Select Committee on OCS Activities has stated that containment in open seas is marginally effective. All of this information leads one to question the capabilities of oil spill technology.

As in the Preliminary Draft EIS, the impacts of an oil spill on the Pismo Clam, an extremely important natural and economic resource, are not discussed. In fact, the exact wording in the DEIS is that the "tolerance of the Pismo Clam to oil pollution has not been examined." (4-90). On page 4-117, the authors state that "on the sandy beach intertidal, the impacts are predicted to be low, but in the absence of data, possibly high at the Pismo Clam area" (emphasis added). Once again impacts cannot adequately be assessed due to lack of data.

The DEIS sorely lacks in developing appropriate and effective conditions to mitigate the adverse impacts that are identified. "Standard" BLM mitigation measures are expected to adequately negate impacts. These are considered to be inadequate because the measures do not address specific local conditions and therefore cannot adequately safeguard and mitigate the impacts.

The DEIS lacks a balanced evaluation of alternatives to the proposed action, particularly the evaluation of the benefits of delaying the sale and placing the area into a petroleum reserve.

There appears to be one last serious omission, the DEIS does not identify the BLM recommended alternative. This is an absolute necessity for a respondent to adequately address the most probable development scheme. This identification is further required by the Council of Environmental Quality Guidelines for the implementation of the National Environmental Policy Act which became mandatory by executive order in July, 1979.

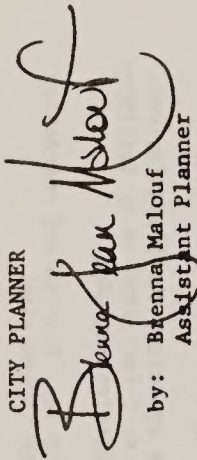
Mr. John Lane
Page 3
July 27, 1980

Given the above comments, the City of Grover City recommends to the Department of Interior and the Bureau of Land Management that Lease Sale #53 be delayed until all pertinent environmental studies and data have been fully completed and all information would be available in order to perform a risk analysis and for use in stipulation development in the environmental process.

In closing, the City wishes to thank you again for the opportunity to comment on the DEIS. The time available for such comments is quickly closing. As such, it is anticipated that the BLM staff will seriously consider the above discussed critical omissions and shortcomings and adopt the recommended action.

Sincerely,

TOM SULLIVAN
CITY PLANNER


by: Brenna Malouf
Assistant Planner

BM/pr

State of California

GOVERNOR'S OFFICE
OFFICE OF PLANNING AND RESEARCH
1400 TENTH STREET
SACRAMENTO 95814

916/445-0282

EDMUND G. BROWN JR.
GOVERNOR

Honorable Cecil Andrus -2- July 3, 1980

The deficiencies and weaknesses of the Draft Environmental Impact Statement do not lend themselves to easy repair. With or without the Santa Cruz, Point Arena, and Bodega Bay Basins, satisfying the requirements of NEPA and CEQ's regulations will require major revisions to the Draft document. I believe that the magnitude of the needed revisions requires additional hearings on the revised Draft if Interior is to comply with the spirit and intent of NEPA.

At your recent hearings, nearly 1,000 Californians testified that the benefits of Sale #53, as proposed, do not justify the risks. Senator Cranston and 39 California Congresspersons, representing both parties, have sent President Carter and yourself the same message. The undeveloped portion of California's coast should not be irreparably sacrificed to provide less than 1/2 of 1% of America's daily petroleum requirements for only 20 years. We can displace a great deal more oil through the use of innovative technology and conservation.

I urge you to delete the Santa Cruz, Point Arena, and Bodega Bay Basins from Sale #53, and to postpone the leasing of the Santa Maria and Eel River Basins until an adequate Draft Environmental Impact Statement can be prepared and subjected to public review.

Sincerely,

Deni Greene

Deni Greene
Director

Attachments

July 3, 1980

Honorable Cecil Andrus
Secretary of the Interior
Interior Building, Room 6151
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Secretary Andrus:

Your statements on the respect given the views of State and local officials in OCS decisions and on small resource estimates not justifying the risks of development give me some cause for optimism. If you adhere to these statements, you will delete the Santa Cruz, Point Arena, and Bodega Bay Basins from Sale #53 and delay leasing the Santa Maria and Eel River Basins until adequate environmental information is available. But your failure to amend the 5-year OCS leasing schedule requires the State of California, local governments and concerned citizens to respond with serious concern to the Draft Environmental Impact Statement on Sale #53.

As documented in the attached comments from State agencies, the Draft Environmental Impact Statement is woefully inadequate. As I indicated in my testimony at your June 23 hearing on the Sale, major inadequacies include:

- The assessment of the economic impacts on fisheries, tourism and recreation is based on inadequate, outdated and incomplete information;
- Conflicts among uses of the coast are summarily dismissed instead of being analyzed and balanced;
- Onshore air quality impacts of OCS activities are presently unquantified-- studies to identify impacts are just now beginning;
- The Sale can not be found consistent with California's approved Coastal Zone Management Plan, as required by federal law;
- The seismic risk, particularly off Santa Barbara and San Luis Obispo Counties, remains unanalyzed;
- Consideration of impacts on marine mammals and other endangered species is inadequate;
- The trust responsibility of the Secretary of Interior to protect the economic, religious and cultural value of the North Coast salmon fishery to California's Native Americans is not adequately considered in the Draft EIS, nor were the affected reservations, tribes and bands properly consulted in the review process; and
- Oil spill trajectory and impact analysis is insufficient to predict the size, nature and extent of likely oil spill damage.

Alternatives to the Sale. The DEIS includes a very brief discussion of alternatives to Lease Sale 53. Despite numerous requests from state and local officials and the public to consider other alternatives, such as the deletion of individual basins, the delay alternative, or the national petroleum reserve alternative, the DEIS includes only a token discussion of the delay alternative and rejections of alternatives deleting basins. Instead, the DEIS has two alternatives to protect air quality and the threatened sea otter, both worthy goals but one-dimensional in their focus. The DEIS does not address alternatives to avoid other more comprehensive impacts through basin deletions. ((iv; 1-8))

The delay alternative should be a serious option to Interior. However, it is handicapped from the outset by an attempt to link it in the reader's mind with phrases like "increase in crude oil imports", "increased dependence on insecure foreign sources of oil", and "decreased employment and income prospects". (4-218) The Delay Alternative was neither seriously considered nor adequately analyzed.

Delay would allow BLM to complete crucial Environmental Studies on marine mammals and seabirds, conflicts of OCS development with commercial fishing facilities, and offshore wind and wave data necessary in oil spill trajectory models, and would allow the Coast Guard to complete its Port Access Route studies. Although each of these studies are responses to severe data gaps in the Northern and Central California area, none of them will be completed before the scheduled sale date of May 1981. The DEIS simply enumerates the benefits of delaying the sale without really analyzing the benefits or discussing the need for the studies' results. Compare the description of the alternative in the Five Year OCS Oil and Gas Leasing Program-EIS to delay Lease Sale 53 for two years with the description of the same alternative in the DEIS:

The 5 Year Program EIS states:

"Resources of particular concern in Central and Northern California include abundant coastal and pelagic birds and their rookeries, and coastal sea mammals. These organisms are known to be extremely sensitive to oil spill impacts. Studies sponsored by BLM are currently underway to develop more information regarding distribution and abundance of these resources. However, all studies will not be completed prior to the final environmental statement for this proposed sale under Alternative 1. This alternative would delay the sale for nearly two years, so that the studies would be fully completed and all information would be available in order to perform a risk analysis and for use in stipulation development in the environmental process... (p. 75, Final Environmental Statement, Proposed Five-Year OCS Oil and Gas Leasing Schedule, 1979)."

In contrast, the DEIS states:

"Delay the Sale Alternative: An alternative of delaying the Sale always exists. Delay might be appropriate given certain conditions. Thus, this alternative is evaluated to present the environmental effects if such a choice were considered.

In delaying the Sale, tracts would be withheld from a sale offering for a period of time. The delay period might vary, depending on the rationale that existed in taking the Delay option. Any delay would cause certain short-term effects. If the Sale were reinstated, however, the impacts would occur as indicated in Section IV.B. The effects are merely postponed in time.

During the delay period, additional environmental information may become available, for example. Certain technological innovations might arise relative to OCS

GENERAL COMMENTS

* STATE OF CALIFORNIA *

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ON OCS SALE #53

operations. Technology could, perhaps, extend oil and gas operations into deeper waters and achieve greater resource recovery. Delay might allow some additional lead time for government to plan for onshore impacts that might occur. Delay could also, however, cause potential economic and environmental losses. Exploration and development of OCS resources at a date further into the future could result in a greater environmental impact to those resource categories discussed in Section IV.B. This possibility exists because multiple uses of the coastal and marine environment could be at a higher level in the future. In all the above noted cases, the likely outcome is speculative and hypothetical only. (p. 2-28)"

Certain other alternatives were rejected by BLM because they were not considered "viable". (2-1) Among these is the alternative of deleting any one of the five basins from the sale. The reason given in the DEIS for not considering this alternative is that there are "no pervasive conflicts" in any basin with OCS development. (2-29) The State strongly objects to this flippancy dismissal. There certainly are pervasive conflicts in the onshore areas of four of the five basins which are largely rural, scenic and undeveloped coastlines. (See section on Onshore Compatibility). The fifth basin is riddled with seismic hazards that may preclude any kind of OCS development at all. Recreation and tourism are major industries in all five of the areas and cannot be lightly deemed unaffected by OCS development as the DEIS does on p. 2-6. Each of the five basins proposed for sale should be analyzed separately for the impacts OCS development would have on the offshore and onshore areas. The basins, spanning a 700 mile stretch of the coast, the equivalent of the length of the east coast from Rhode Island to South Carolina, encompass many diverse habitats, geologic conditions, socio-economic structures, and hydrocarbon potential. To lump them all together into one impact assessment, and not even treat them individually, is simplistic and misleading.

The Council on Environmental Quality Guidelines for Implementation of NEPA, now mandatory, require a DEIS to identify a preferred alternative. This has not overtly been done by BLM for Lease Sale 53, although the bias in the document in favor of the proposed action is clear. The preferred alternative should be identified to allow a respondent to address the most probable development scheme.

Cumulative Impacts:

The DES includes assessments of cumulative impacts in several issue areas but the analysis is sketchy and too general to be useful. For example, in the air quality impact analysis, the existing air quality problems are discussed in conjunction with Lease Sale 53 emissions but there is no mention of what range of resource estimates is being used for the analysis. Such an omission leaves the reader questioning the accuracy of the statement that emissions from sale 53 activities alone will not exceed ambient air quality standards. (p. 4-72)

Several sections have no cumulative impact analysis at all, most notably the land use section. The DES does not address the effects that OCS development would have on the different onshore areas affected by the sale. OCS development, in addition to other projected development, especially other possible energy development in San Luis Obispo county, could dramatically alter the scenic and undeveloped coastline of much of the 53 area.

Finally, the DES totally ignores the issue of the cumulative impacts of successive lease sales projected for California in 1983 and 1984 in the National Five Year OCS Leasing Program. For example support facilities built for sale 53, identified as "temporary" in the DES, would be used for subsequent sales as well and therefore would have a greater impact on the coast than predicted in the DES. The same case exists

for oil spill, air quality, and other impact areas that Lease Sale 53 will affect alone and in combination with other sales. To be considered adequate the FES should include this analysis.

Consistency of the Proposed Lease Sale. The California Coastal Commission holds that the federal Coastal Zone Management Act requires the Secretary of Interior to determine that his Proposed Notice of Sale for OCS Lease Sale #53 is consistent, to the maximum extent practicable, with the California Coastal Management Program. Section 307(c)(1) of that Act requires that:

Each Federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs.

While the Commission and the Secretary of Interior have been unable to agree in formal mediation proceedings that the Secretary must submit such a determination for OCS lease sales, the Commission continues to maintain that the Final Notice of Sale is the key federal activity which opens thousands of acres of the OCS to oil and gas development and is a federal activity directly affecting the coastal zone. Under National Oceanic and Atmospheric Administration regulations implementing the Coastal Zone Management Act, the federal agency must submit a consistency determination to a state coastal management agency 90 days prior to final approval of the federal activity. Therefore the Secretary of Interior should include the consistency determination in the Proposed Notice of Sale for Lease Sale #53. The Commission will then have 45 days in which to agree or disagree with the determination. To assist the Interior Department in making such a determination, the Commission is adopting a preliminary position statement detailing which basins and tracts should not be offered for lease and which stipulations should be included if the Sale is to be consistent with the federally approved California Coastal Management Program. Interior can analyze these tract deletions as an alternative in the Final Environmental Impact Statement. The EIS must analyze and discuss California's CMP policies in detail. The discussion at page 1-79 of the DEIS is inadequate.

Marine Resources

As acknowledged in the DEIS, the Sale 53 area encompasses numerous areas with official State or Federal status as unique biological environments. The map on page 1-81 shows the 67 areas which have been designated as parks, sanctuaries, reserves or recreational areas by County, State or Federal agencies. Omitted from BLM consideration on this map is the State designation of the Farallon Islands as a marine life refuge as well as a Federal National Wildlife refuge and the designation of many other marine life refuges and reserves along the entire Northern California coastline. In particular, we wish to note the omission of those refuges immediately adjacent to the proposed Santa Cruz and Santa Maria Basin tracts.

To weigh the risks inherent from Sale 53 on those resources which must be protected under the Act, we have examined the oil spill model used to determine spill probability for each segment of coastline. From information provided in the DEIS there appears to be a very high level of uncertainty in the basic data used to construct the model.

As stated in the DEIS: "The Department of the Interior Oil Spill Risk Analysis Model uses available oceanographic and meteorological data in conjunction with local critical resources which, combined with estimates of oil to be produced, provides a means of: 1) analyzing the probabilities of OCS - related oil spills occurring and 2) determining the probability of such a spill reaching a sensitive area or resource." (emphasis added) The word "available" is emphasized because BLM has stated in both the 1978 and 1979 OCS Environmental Studies Plan,

"For offshore predictive trajectory studies, the available information provides only a very general description of the wind and current regime. Current data have been collected mostly from hydrographic casts and drift card studies. There are very few direct current meter or drogue measurements for the area. For meteorological data, the largest data gap in coastal climatological information is the lack of permanent weather stations offshore. Nearly all offshore climatological information is from ship observations. In many areas, the limited number of ship observations makes the representativeness of the data suspect. (Also, ships tend to avoid severe weather occurrences, possibly biasing the information towards good weather conditions.) A synthesis of historical physical oceanographic and surface meteorological data is not available for the northern California OCS." (emphasis added)

We understand that B.L.M. has contracted for a summary and analysis of available physical oceanographic and meteorological data for the area, but according to a March 27, 1980 B.L.M. status sheet of ongoing contracts, the results of the study in the form of a draft final report were not expected until May, 1980. The Pacific OCS office is now preparing a work statement for a Northern California meteorological buoy placement study to collect offshore wind data, but since no contract has been let, the results of this sort of long-term study will not be available for some time. Thus, the oil spill model, which is the core of the whole risk assessment analysis, appears to be built upon a very inadequate data base. (see Oil Spill section)

The "Evaluation" prepared by the Coastal Commission's consultants arrives at a similar conclusion. As stated in the preface of the report,

"The major area of concern that was commented upon over and over again was the Oil Spill Risk Analysis which follows from the Oil Spill Trajectory Model.

Environmental Studies. The DEIS is deficient in making adequate impact and risk assessments because key parts of such assessments have not yet been done. There are no systematic long-range studies of either sensitive habitats and species or of factors that contribute to risks from oil spills, primarily oceanographic and meteorological data for the California offshore environment. Interior's own Pacific Regional Environmental Studies Plans indicate this in the justifications for proposed projects. These points are made repeatedly in "An Evaluation of the BLM Environmental Studies Plan and Draft Environmental Impact Statement for OCS Lease No. 53", prepared for the Coastal Commission by Monterey Aero Services, which is attached and incorporated into these comments (hereafter called "Evaluation").

Another two to four years are needed to complete the geohazards surveys that would enable determination of which tracts should be deleted from the sale. The Risk Assessments for Marine and Coastal Habitats are only now in procurement. But they come before completed Marine Mammal and Seabird Survey work and wind wave data gathering. BLM is also preparing a study on "Conflict of Space and Facilities Use Between the Fishing Industry and OCS Activities", scheduled for completion in early 1981. Again, this will not be enough time to factor the results of this study into the final decision on the lease sale. The study of the effects of oil on commercial and sport fisheries is only now under procurement, another example of the original data gathering coming after risk assessments and lease sale predictions. Commercial fishing is an economic mainstay in many of the small communities along the northern and central California coast and should receive more serious consideration in the final decision on sale #53, when the studies are completed.

The entire assessment process is backwards; with predictions for the lease sale coming first, then risk assessments, then original data gathering. The DEIS was written without even the compilation of existing wind and wave data being done under the Environmental Studies Program. Major information gaps include lack of knowledge of critical and sensitive habitat areas offshore, particularly feeding and resting areas for seabirds, and of alternative feeding areas should major ones become contaminated by an oil spill. The lack of this information makes the DEIS inadequate.

It was felt that meteorological and oceanographic data input into the oil spill trajectory model was incomplete, insufficient and incorrect and, therefore, the model and the oil spill risk analysis were suspect. Since BLM's environmental concerns and the resultant DEIS rested heavily upon the accuracy and predictive capabilities of this model, reviewers felt that this should be thoroughly examined. What they found added to their concern about the credibility of the Oil Spill Risk Analysis. The FY 80 procurement for a series of offshore weather buoys in Central and Northern California appeared to confirm their suspicions about the validity of input wind and current data. The final paragraph in BLM's Reference Paper No. 53-2 "Oil Spill Risk Analysis of Proposal OCS Sale No. 53 Central and Northern California" made the reviewers feel that the DEIS had taken the oil risk analysis finding further than warranted, and had transformed an exercise in modeling into scientific fact." (emphasis added)

The Evaluation includes analysis of the EIS sections on Intertidal and Subtidal Areas, Fisheries, Marine Mammals and Seabirds. A brief overview of the findings is included following:

Intertidal and Subtidal Areas

This section of the DEIS is considered to be inadequate, incomplete, and in many instances, contradictory. Important areas like estuaries and wetlands only receive a brief note and no attempt to identify at what estuaries might be affected or to discuss in detail how containment might be achieved.

Serious shortcomings are also cited for BLM's analysis of potential impact to the benthos based on their oil spill model. The DEIS is completely inadequate for making leasing decisions and should be completely rewritten by authors familiar with the literature in this area.

Marine Mammals

The major shortcomings of this very important section of the DEIS appear to be: ignorance of existing data; a lack of specific information about Northern California, because no results of the Environmental Studies contract for marine mammals were yet available; inaccuracy in the discussion of potential impact to specific populations at locations of animal concentration during periods of known vulnerability and the lack of discussion of the potential impact of the chronic pollution from the 163 minor spills expected during the life of the project. The only element of this DEIS discussion considered adequate was the consideration of general "impactability" of marine mammals.

The validity of the BLM oil spill model is questioned. Even with the use of erroneous assumptions which minimize predicted risk, the impact on several key areas of animal concentration may be considered unacceptably high.

In addition to the critique of BLM's analysis, the Evaluation includes much information lacking in the DEIS, suggestions for how to more effectively use existing data as well as data generated by the USCS marine mammal survey, and suggestions for effective mitigation and possible lease stipulations.

Seabirds

Generally, the Evaluation found that the DEIS addressed most of the important sources of impact to seabird populations and, for the most part, fairly and accurately presented the information characterizing the current state of knowledge. Also the discussion of general effects of oil pollution and human intrusion on bird nesting areas was considered to be relatively complete, though the impact of a specific oil spill event was not addressed. However, several serious drawbacks to the overall presentation are discussed in great detail. Five key shortcomings of BLM's analysis are outlined and include (1) deficiencies in the oil spill model, (2) erroneous conclusions which do not follow from existing knowledge or even the discussion in the DEIS, (3) lack of analysis of impact from chronic and catastrophic spills predicted, (4) lack of information about the susceptibility of the common murre, California's dominant breeding seabird, to oil pollution and (5) the erroneous identification of critical habitats for seabirds in the oil spill analysis.

The Evaluation also outlines a large amount of information and analysis which must be included before the DEIS can be considered adequate. The alternatives presented are also critiqued, and their lack of real value to protecting species and critical habitats is demonstrated.

Serious shortcomings of the oil spill model are discussed and the reviewer points out that the documentation and analyses supporting BLM's 2.29 large spill figure is used to emphasize the low probability of impact on any one given area. He maintains, and rightly so, that the emphasis should instead be on predicting the effects of even one of these large spills, since the model predicts a spill of this size with certainty.

Finally, the major conclusions in the DEIS are considered to be the reverse of that which should be derived from the evidence presented in the DEIS and from the literature which is already available. A set of clear and useful recommendations for rectifying the identified deficiencies concludes the review. The "Delay of Sale" alternative is considered imperative to enable BLM to conduct the necessary analysis prior to making leasing decisions.

Protection of Endangered Species

The DEIS does not adequately address measures which must be taken to protect endangered species in the Lease Sale 53 area from Point Conception north to the Oregon border. The DEIS lists 29 Federally recognized and proposed endangered species found in this area (pgs. 3-62 to 3-64). Seven species of endangered cetaceans (whales, porpoises, and dolphins) are found off the central and northern California coast, as well as the southern sea otter (a threatened species) which is acknowledged by BLM to be extremely vulnerable to impacts from offshore petroleum development. BLM must take a careful look at all the possible ramifications of LS 53 upon endangered species.

Pursuant to Section 7(a)(2) of the Endangered Species Act, BLM must consult with appropriate fish and wildlife agencies to assure that the lease sale is not likely to jeopardize the continued existence of any endangered or threatened species. Section 7(b) requires a biological opinion on the effect of the lease sale on endangered or threatened species which includes reasonable and prudent alternatives to carry out Section 7(a)(2). Lastly, Section 7(d) forbids irreversible or irretrievable commitment of resources if reasonable and prudent alternative measures would be foreclosed by the action. The duty to consult is not fulfilled until a biological opinion based on adequate information has been completed.

Even though Lease Sale 53 has been contemplated for some time, no biological opinion has been included in the DEIS. Rather, the DEIS notes (pg. 1-11) that DOI is presently consulting with the US Fish & Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) under Section 7 of the Endangered Species Act. Biological opinions will not be available during the review period of the DEIS and therefore will not be subject to public comment. Accordingly, the public will not have the chance to review, as part of the NEPA process, the assessment by FWS and NMFS as to the likelihood of the Lease Sale's effect upon the continued existence of the endangered or threatened species present in the Lease Sale 53 area, nor will there be an opportunity for review of any alternatives proposed by those agencies. BLM states, however, that the biological opinions will be included in the Final EIS. FWS has stated that the opinion may not be completed by the time of the Final EIS.

With the recent announcement by the Secretary of Interior that the National Five-Year Leasing Schedule has accelerated the publication date of the Final EIS to September and the Proposed Notice of Sale to October, it is possible that the consultation with FWS and NMFS would not be complete and the biological opinion would not be submitted in time for incorporation into either the Final EIS or the Proposed Notice of Sale stipulation and tract deletion decisions.

BLM proposes Alternative 3 in the DEIS which deletes 27 tracts in the northern fifth of the Santa Marin Basin with the objective of enhancing protection of the sea otter. While the State supports deletion of tracts to protect the sea otter, it is impossible to assess the adequacy of the deletion of these specific tracts upon the continued existence of the sea otter in the absence of the biological opinions required by the Endangered Species Act. While the probabilities of a spill hitting a portion of the sea otter range now are alleged to be reduced according to the DEIS (Pg. 2-21), there are still significant probabilities of a spill hitting the sea otters even under BLM's analysis. Therefore, without the biological opinions, one cannot comment upon the effectiveness of the proposed tract deletions vis-a-vis protection of the threatened species.

The marine mammals listed at page 4-93 of the DEIS as most vulnerable to impacts from petroleum development offshore Northern and Central California include 6 endangered whale species and the southern sea otter, a threatened species which is considered to be "extremely vulnerable". In spite of this extreme sensitivity, the entire existing population of sea otters (approximately 1500) is bounded by the two largest LS 53 tract areas. In the event of an oil spill, DOI acknowledges that the prognosis for rescuing more than a few sea otters is "dim" (pg. 4-94). Even without the benefit of the biological opinions, BLM concluded that there is a slight possibility that Lease Sale 53 could threaten the existence of the sea otter (pg. 4-112). The sea otter was placed on the threatened list because of the oil spill threat from existing tanker operations. The DEIS acknowledges that the sea otter could be affected by cumulative OCS impacts (pg. 4-120), but does not adequately consider the cumulative impact of existing tanker traffic and LS 53 activities upon the sea otter.

In discussing unavoidable adverse impacts, the DEIS notes that such impacts "could occur to endangered and threatened species of marine mammals and birds having the potential to cause a drastic reduction in existing sea otter population". We submit that the Endangered Species Act requires that adverse impacts which threaten the continued existence of any endangered or threatened species must be avoided. Furthermore, in discussing the irreversible or irretrievable commitment of biological resources, the DEIS notes that:

Irreversible and irretrievable commitment of an endangered species may result if populations of a species are affected by spills, either initially or through food contaminations, or by any other disruption or disturbance that may result from the proposed sale. Resources of special concern and of possible irretrievable nature are the populations of sea otters in central California, and the populations of seabirds and pinnipeds on the Farrallon Islands and Ana Nuevo Island. (Pg. 4-196).

The State submits that the Endangered Species Act clearly requires that the continued existence of endangered or threatened species in the LS 53 area not be threatened. In the absence of the required biological opinions, the DEIS is inadequate both in its consideration of endangered and threatened species and because the State and the public have been deprived of the opportunity to comment on appropriate alternatives to assure the protection of such species.

oil spills. Section 30232 of the Coastal Act, which is incorporated into the California Coastal Management Program (CCMP), provides:

Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.

The DEIS predicts that 2.29 oil spills over 1000 barrels will occur somewhere along the coast during the life of the project, and 163 "small" spills under 1000 barrels. This prediction is based on an Oil Spill Risk Analysis Model that assumes the risked mean of oil will be produced (4-2). Current data from a study in the Southern California Bight was used, as was wind information from the Sale #53 area. Worst case analysis was made for each shoreline segment, defined as the 30th day location of the spill. Each of these assumptions is misleading: first, why are current data from Southern California used to predict oil spill risk for central and northern California? This would seem to invalidate the model's results at the outset. "Worst" case analysis is not in fact worst case, but only the location of a spill on the 30th day; a real worst case spill would not use risked mean estimates but would employ the estimates for the high find range. Worst case analysis should include probability estimates for spills over 10,000 barrels and 100,000 barrels of oil. The DEIS gives no basis for its estimate of large spills. Therefore there is no way to assess the credibility of the estimate under conditions of a frontier environment. Possible gaps, omissions and inadequacies cannot be identified. Something like "maximum credible catastrophe" should be assessed for each transportation scenario, which would include "worst likely spills, coupled with worst likely drifts, and producing worst likely impacts". Finally, the model fails to take into account the likely possibility that the oil industry would not develop the Bodega or Point Arena Basin unless the oil finds there were considerably higher. An assumption of higher finds in the modelling would lead to much higher risks of oil spills because of increased amounts of oil being transported in tankers and barges.

The model may also be flawed because results of studies on physical oceanographic and meteorological data for the area are not yet completed and in fact will not be available before the sale in May, 1981. The need for this study casts a shadow of skepticism on the Oil Spill Risk Analysis and the data it is based on.

An estimate of zero risk from earthquakes is an assumption questioned by other agencies (e.g. National Transportation Safety Board, DOE) (P.16 POCS Reference Paper No. 53-2). Because no spills have been caused by seismic activity in the past does not mean a zero risk exists. The use of data in the oil spill trajectory model should combine spill probability and impact probability to yield a "net probability" of impact on a given segment of shoreline.

Bias in impacts assessments is evident: For example, a coastal recreation-oriented industry is assured that business will simply move to another competitive area of the coast in the event of a large spill. The DEIS states tourism would be relatively unaffected and would "tend to be absorbed by the rest of the sale area." This assumption is typical of the DEIS: the

sale area is 700 miles of coastline -- how could an impact in one area be mitigated automatically to another section of the coast? (2-6). There are also some contradictions in the DEIS on assessment of impacts from oil spills. On P. 4-117, the DEIS states that cetaceans, pinnipeds, birds, plankton, kelp, and terrestrial plants and animals are not expected to suffer high long term impacts -- yet on the next page, the DEIS admits that "impacts caused by long-term chronic oil pollution remain uncertain." Which statement is true, if either?

There is almost no discussion in the DEIS on the present availability of oil spill containment and cleanup equipment in Central and Northern California and the need for oil spill cooperatives along the coast should the sale occur. The DEIS should include a discussion of likely sites for these cooperatives in the mitigation section of the oil spill analysis.

No evaluation of the effectiveness of current oil spill technology was made in the DEIS. This is a serious omission and could mislead the uninformed reader into thinking that the containment and cleanup equipment available today is capable of cleaning up spills in more than light wind and 5-foot high waves. The state of the art in oil spill technology is extremely ineffective, a fact that should have been discussed in the impacts section of the oil spill analysis. One can not assume that spilled oil is likely to be contained and removed under most conditions.

Consultation with State and local governments. The DEIS indicates that the Department of Interior does not take seriously the Congressional mandate to coordinate and consult with States and local governments which are affected by OCS lease sale decisions. In Section 102 (6), Congress stated that one of the purposes of the Outer Continental Shelf Lands Act was to:

assure that States, and through States, local governments, which are directly affected by exploration, development, and production of oil and natural gas are provided an opportunity to participate in policy and planning decisions relating to management of the resources of the Outer Continental Shelf. (emphasis added).

In an attempt at consultation, which in retrospect can only be viewed as a sham, the Pacific OCS Office circulated a "Preliminary" DEIS to State and local government before publication of the Draft and stated that they would accept comments. Several hundred pages of comments were submitted. In spite of the efforts of State and local government to assist the Pacific OCS office in preparation of the DEIS and to assure that information was complete and accurate, the Pacific OCS Office proceeded to ignore nearly all the comments and publish a document that is inadequate under NEPA and the CEQ guidelines.

As further indication that DOI does not take seriously its requirement to consult with State and local government under Section 19 of the OCS Lands Act, as amended, the recently announced Five-Year National OCS Leasing Schedule allows only two months between close of the comment period on the DEIS and publication of the Final EIS. Given publication schedules and time for in-house review, we have calculated that DOI staff will have approxi-

mately four weeks to analyze, consider, and respond to an enormous amount of comment and scientific testimony presented by State and local agencies, interest groups and members of the public. No staff, however, competent, can adequately undertake and complete such a monumental task.

Section 19 of the OCSLA authorizes the Governor and local executives to submit recommendations to the Secretary of Interior regarding the "size, timing and location" of a proposed lease sale. The Secretary is required to accept the recommendations of the Governor "if he determines, after having provided the opportunity for consultation, that they provide for a reasonable balance between the national interest and the well-being of the citizens of the affected State." (Section 19 (c)). Comments on the Draft EIS provide the State with the first formal opportunity to comment upon the information be used by the Secretary in reaching his decision on the proposed notice of sale. If the EIS is inadequate and the schedule has not permitted adequate time for consideration of comments which discuss those inadequacies, the Secretary will not have adequate information upon which to analyze the Governor's comments on the proposed notice of sale. It follows that the Secretary will likewise not have adequate information upon which to balance the national interest and the well-being of the citizens of the State of California in determining whether to accept or reject the Governor's recommendations.

The consultation provisions of the OCSLA demand careful consideration and response. Yet, DOI has established a schedule which dictates that comments cannot possibly be carefully considered by the decisionmakers.

Navigation. The section on Transportation Systems, Ports and Shipping (p. 3-111) recognizes that the Coast Guard is studying port access routes along the central and northern California coast pursuant to the Port and Tanker Safety Act of 1978. The DEIS notes that "adoption of the routing measures before the sale is unlikely." The DEIS also notes that extension of vessel traffic lanes south of San Francisco "could have a major impact on the oil and gas development for the proposed Santa Cruz area tract selection." (p. 3-112) In the conclusion section on Navigation, the DEIS notes "Traffic lands(sic) crossing the Eel River and Santa Maria tracts could increase the cost of exploration and development substantially." (pg. 4-166)

The DEIS is totally deficient in analyzing the impacts of oil leasing and development on navigational safety. Instead it mentions the impacts of Coast Guard designation of vessel traffic lanes on offshore oil development. The Port and Tanker Safety Act, however, directs the Coast Guard to give paramount consideration to navigational safety in designating port access routes, including possible vessel traffic lanes, vessel traffic separation schemes and safety fairways offshore central and northern California. If there were no oil leasing being considered, the Coast Guard would most likely establish vessel traffic lanes a reasonable distance offshore headlands and on the most direct routes to and between ports on the California coast. Only because oil leasing is being considered is the Coast Guard considering lanes far offshore and the deletion of southerly and northerly approaches to San Francisco Bay. The DEIS does not analyze the effect of leasing on navigational safety and on vessel traffic lane alternatives or the benefit of delaying the sale until one of these alternatives is selected. It also does not analyze potential vessel - platform interactions and the increased risks involved. It does not balance these considerations, nor does it give paramount importance to navigational safety, as mandated by the Port and Tanker Safety Act.

Compatibility of Tracts with the California Coastal Management Program. (CMP)

The DEIS not only fails to describe the character of the areas onshore of the basins but is replete with inconsistent statements of impacts on existing area character and land uses. For example, on p. 1-24 the DEIS states that a basic development assumption would include four "major onshore operations facilities" in Humboldt, San Francisco, and Morro Bays and Port Hueneme. But on p. 4-21, the DEIS states that five "temporarily operational support bases" could be constructed onshore of the five basins - in Manchester, Bodega Bay, Half Moon Bay, near the Santa Maria River, and between the Eel and Mad Rivers.

What is the difference between a major onshore operations facility and a temporarily operational support base, and why are different sites chosen? The DEIS reflects a poor understanding of land use issues, a central concern reflected in the State's comments.

The CMP also protects wetlands along the Coast.* The DEIS states that oil entering estuaries may remain for several days, causing massive mortality requiring over 10 years for recovery. (4-114) This assessment of severe impact would seem to lead to recommendations for deletion of certain tracts from which oil spills would hit the major wetland areas documented on p. 4-115 ff, or at least lease sale stipulations requiring standby oil spill equipment near these wetlands. But no such recommendations were made in the DEIS.

In general, the DEIS treatment of land use impacts is inadequate - a total of 2 1/2 pages of text is devoted to a discussion of this issue.

A list of land use conflicts is included in the "California Coastal Commission Comments on the Draft Environmental Impact Statement on Proposed OCS Lease Sale #53", adopted June 4, 1980 by the Commission and submitted at the June 23, 1980 public hearing on the DEIS. These comments are a portion of the State comments on the DEIS.

*See California Coastal Act, Sections 30253, 30240

Commercial Fishing. OCS development activities will have the greatest effect on the commercial fishing industry, according to the DEIS. (2-9) Both normal development activities, such as platform placement and discharges from OCS drilling operations, and catastrophic events, such as a large oil spill over 1000 barrels, could significantly reduce commercial fishing activities and cause substantial economic losses to the fishing industry. Statistics used in the DEIS are extremely outdated-1968 catch figures. More recent figures are available from the California Department of Fish & Game.

Beyond the general assessment of impacts on the commercial fishing industry, the DEIS is vague about specific impacts on different species of fish, stating that impacts "should", "would", "could", "may", and "are expected" to be insignificant or else that "it would be improbable" or "unlikely" that such impacts would be longlasting. This is another example of the apparent bias of the authors of the DEIS in attempting to downplay the impacts of OCS development and oil spills on commercial fisheries. These assessments conflict with the statement on page 2-10 of the DEIS that the actual impact on commercial fishing from OCS development cannot be quantified.

One of the greatest adverse effects to the fishing industry from OCS development will be the competition for harbor space between OCS support vessels and commercial fishing vessels. This potential space use conflict is recognized as a significant adverse impact in the Environmental Studies Program and is currently the subject of an environmental study. Unfortunately, as is the case with many of the issues with Lease Sale #53, this study will not be available to the public until early 1981 at the earliest, after the Proposed Notice of Sale is issued.

The commercial fishing industry in northern and central California is central to the economy of the area, which is composed mostly of small villages and towns. The 10 percent decline in flatfish and lingcod anticipated for the Eel River Basin in the DEIS would cost Humboldt County's economy, already depressed about a quarter of a million dollars annually. Should oil be present or chronic pollution have impacts greater than BLM has predicted, declines in salmon could triple these losses. Salmon will suffer the greatest impacts from OCS development stated in the DEIS (2-9). Given that the Secretary of Commerce has just adopted the Pacific Salmon Fishery Management Program to protect the salmon, the DEIS should include an assessment of the conflict of OCS development with this program. The DEIS concludes that fishery impacts will be insignificant because they will be masked by normal variations in annual catch. But they may be in addition to these normal variations, further disrupting an industry already stressed from many sides.

Along the Mendocino County coast, 1 to 4 small spills could reach the nearshore intertidal areas and estuaries that could lead to decreases of up to 10 percent in salmon catch and have adverse impacts on abalone and nursery areas for other commercially valuable species. A large spill, over 1000 barrels, has a 10 percent chance of occurring off the Mendocino coast during the life of Lease Sale 53 alone, and would cause even greater damage to the fishing industry.

The DEIS does not point out that one of the two most feasible onshore support facilities is located Noyo Harbor, which is now full with commercial fishing uses and support facilities. Construction of OCS related facilities in Noyo Harbor would occur only at the expense of wetlands in the Noyo River estuary and of existing and proposed commercial fishing facilities in the harbor.

Another feasible onshore support facility for OCS activities mentioned in the DEIS is Morro Bay. Morro Bay was designated by the CDFG in 1974 as one of 11 coastal wetlands in the state that are sensitive to development and therefore

are given special protection by the Department. ("Acquisition Priorities for the Coastal Wetlands of California", California Department of Fish and Game, 1974.) Any development in these identified coastal wetlands would be subject to stringent conditions such as a prohibition on dredging. This would make any potential siting of an OCS service base highly unlikely in Morro Bay. Bodega Bay is also one of the 11 identified wetland areas and is also suggested as a possible site for OCS support facilities in the DEIS.

NEPA AND THE CEQ GUIDELINES

The Draft EIS is inadequate because it does not comply with the requirements of NEPA and the CEQ Guidelines.

(President's Council on Environmental Quality NEPA

Guidelines, 40 C.F.R. Part 1500 et seq., hereinafter "CEQ Guidelines".)

A. DEIS Discussion of Alternatives is Inadequate

Examination of the DEIS demonstrates that the discussion of alternatives is inadequate, under NEPA and the CEQ Guidelines. The DEIS fails to adequately treat the alternatives it does explore, and in addition utterly fails to explore other reasonable alternatives which could mitigate adverse impacts. This deficiency is especially significant in light of the fact that the discussion of alternatives is the "heart of the environmental impact statement." (40 C.F.R., § 1502.14.) The requirements for a proper discussion of alternatives is set forth in various sections of the CEQ Guidelines.

Section 1502.1 requires that the EIS:

"... shall provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." (Emphasis added.)

Section 1502.2 requires:

"

"(d) Environmental impact statements shall state how alternatives considered in it and decision based on it will or will not achieve the requirements of sections 101 and 102(1) of the Act and other environmental laws and policies.

"(e) The range of alternatives discussed in environmental impact statements shall encompass those to be considered by the ultimate agency decisionmaker." (Emphasis added.)

Section 1502.14 is titled "Alternatives including the proposed action," and states the requirements for alternatives in some detail as follows:

"This section is the heart of the environmental impact statement. Based on the information and

analysis presented in the sections on the Affected

Environment (§ 1502.15) and the Environmental

Consequences (§ 1502.16), it should present the

environmental impacts of the proposal and the

alternatives in comparative form, thus sharply defining

the issues and providing a clear basis for choice among options by the decisionmaker and the public. In this section agencies shall:

(a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.

(b) Devote substantial treatment to each

alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.

(c) Include reasonable alternatives not within the jurisdiction of the lead agency.

(d) Include the alternative of no action.

(e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.

(f) Include appropriate mitigation measures not already included in the proposed action or alternatives." (Emphasis added.)

The requirements of section 1502.14 are also discussed in section 1502.16.

The inadequacy of the discussion of the alternatives listed in the DEIS will be pointed out in other portions of the State of California comments. The failure to devote substantial treatment to each alternative considered and to include other reasonable alternatives which would avoid or minimize adverse effects (40 C.F.R. § 1502.14) is demonstrated in part by the following points.

1. Alternative 2 deletes part of 2 basins to improve air quality. The discussion of this alternative points out that "The mitigating effect of this alternative on

projected Sale No. 53 - related oxidant levels is probably not significant. Thus without further mitigation this alternative would have an adverse impact upon onshore oxidant levels." p. 2-14 to 2-15. The stated rationale for presenting an air quality alternative which does not mitigate air quality problems is that the OCS air quality regulations will provide the necessary mitigation. p. 2-15. However, as set forth in the comments of the Air Resources Board ("ARB"), the assumption that the air quality regulations will provide adequate mitigation is erroneous. (See also California's Comments on the National OCS Air Quality Regulations, and California's Comments on the Proposed California OCS Air Quality Regulations, incorporated herein by reference.)

Moreover, the fact that the mitigating effect of these controls will not even be considered until the Final EIS (p. 4-62) deprives California of the opportunity to make meaningful comments on this issue which can be addressed in the FEIS. See 40 C.F.R. 1500.1(b). This procedure also assures that the FEIS cannot adequately respond to State concerns. See 40 C.F.R. 1503.4. This procedure is inappropriate not only under NEPA, but also under the Outer Continental Shelf Lands Act Amendments of 1978 ("OCSLAA"). One of the stated Congressional purposes in passing the 1978 Amendments was to provide States with "timely access to

information regarding activities on the Outer Continental Shelf, and opportunity to review and comment on decisions relating to such activities, in order to anticipate, ameliorate, and plan for the impacts of such activities" and also assure that States had the "opportunity to participate in policy and planning decisions relating to management of the Outer Continental Shelf." OCSLAA § 102(5)(6). See also OCSLAA § 19.

In addition, no other alternatives are discussed which would mitigate air quality effects.

2. Alternative 3 proposes deletion of part of the Santa Maria area to enhance sea otter protection. However, there are no alternatives which even consider mitigation for the many other endangered and threatened species affected by Lease Sale 53. This will be discussed further in California's Endangered Species discussion.

3. Alternative 4 proposes delay of the sale. The discussion of this alternative is inadequate because it fails to mention some significant benefits of delay. The DEIS itself demonstrated that the final reports of marine mammal and seabird surveys, Geological Hazards Assessment for Lease Sale 53, as well as other environmental studies, will not be available prior to the decision to lease. (p. 1-55 to 1-56.) Although the DEIS mentions that delay would allow more time for environmental studies (p. 4-218), this benefit is not

discussed with any specificity, and the fact that critical studies could be completed if the sale were delayed is not really brought to the attention of the decisionmaker.

Moreover, the Coast Guard's Traffic Separation Scheme ("TSS") will probably not be established before the final decision to lease. (p. 3-111, 4-165, 4-166.) Another benefit of delay would be to allow planning of the Lease Sale based upon the information derived from the TSS, but once again the discussion of this alternative leaves the decisionmaker unaware of this important fact. (See p. 4-218.)

4. Alternative 5 involves cancelling the sale. The cancellation of Lease Sale 53 was not considered as an alternative at all during the programmatic stage. California was critical of this omission, and repeatedly pointed out that the resource potential for this sale is low when compared with environmental risk, particularly in three of the five basins. (See California's Comments on the programmatic EIS, incorporated herein by reference.)

Now that the analysis is proceeding at the lease sale level of specificity, the alternative of cancellation is still not seriously considered because it would allegedly result in lower production goals. (p. V, 4-217.) The failure to seriously consider cancellation of this sale renders the DEIS deficient

under both NEPA and the Outer Continental Shelf Lands Act Amendments of 1978 ("OCSLAA"). Any deficiency in production goals could be rectified by scheduling a different sale, and this reason alone is not adequate to render serious consideration of cancellation unnecessary.

5. Other Reasonable Alternatives. Only two other alternatives were considered in the EIS process, and neither was analyzed in the DEIS. Deleting three of the basins was found not to be a viable option because "conflicts between OCS development and other coastal and marine resources were not pervasive enough to warrant exclusion of these basins." (p. 2-29, 2-30.) California strongly disagrees with this analysis (See California Coastal Commission comments). In any event, the option of deleting the low resource potential basins must be analyzed in the EIS because it is a reasonable alternative which would clearly avoid or minimize adverse impacts. 40 C.F.R. § 1502.1, 1504(c). It is an alternative which California specifically proposed at the Programmatic Stage, and which the Department of Interior also refused to consider at that point. 1/

1. The only other alternative considered was the "Explore But not Develop Alternative."

The DEIS is patently deficient because of its failure to address other reasonable alternatives as required by the CEQ Guidelines. Other reasonable alternatives are proposed in other portions of California's comments. The following are some examples of reasonable alternatives which should be considered:

- (1) Deletion of the 3 low resource, high risk basins, with delay of the remaining 2 basins until environmental studies and the Coast Guard's Traffic Separation Scheme are completed and analyzed.

- (2) Phased development sales. Because this is a frontier area for sales, Interior should consider breaking the lease sale into phases (e.g. basin by basin) and analyzing the information obtained from one area before proceeding to lease the next.

- (3) Endangered species protection alternative. There is one alternative which considers mitigation for the sea otter, alternative 3. However, the DEIS lists 24 endangered species in the area under consideration, and additional species which are threatened. p. 3-61 to 3-64. The DEIS points out that two areas (the Fallaron Islands and Castle Island) account for over 50% of the nesting

seabirds in California. In light of the fact that there are endangered seabirds on the list, the DEIS is deficient because it does not even consider an alternative deleting these islands.

. In addition, the DEIS also points out that in "the fall, nearly all of the worlds population of ashy storm petrels are found near the Monterey Canyon, Monterey Bay." (p. 3-57) Although this bird is not on the endangered species list, the DEIS makes it evident that an oil spill near Monterey Canyon in the fall would very clearly endanger this species. Nevertheless, the DEIS does not consider any alternative deleting this area. In examples such as these, it appears that deletion of very small geographical areas could provide invaluable safety to endangered or threatened species with only an insignificant loss of potential area to drill for oil. Nevertheless, such deletions are not even presented to the decisionmaker as alternatives.

In addition, alternatives must be developed to mitigate the effects of resource development on the many other endangered and threatened species listed in the DEIS. For

example, alternatives could be developed to delete the breeding grounds of endangered species or to forbid production during the breeding or migration seasons of endangered species. The failure to even consider such alternatives demonstrates that the DEIS does not adequately address mitigation, as required by the CEQ Guidelines. See 40 C.F.R. § 1502.14(f).

B. Conflicts With State Policies

Section 1502.16(c) of the CEQ Guidelines requires that the EIS "shall include discussions of:

". . . .

"(c) Possible conflicts between the proposed action and the objectives of Federal, regional, State, and local (and in the case of a reservation, Indian tribe) land use plans, policies and controls for the area concerned." (Emphasis added.)

As the California Coastal Commission comments will set forth in more detail, the DEIS fails to adequately discuss conflicts with the State policies contained in the Coastal Act and the California Coastal Management Plan.

C. Treatment of "Unresolved Issues" .

The CEQ Guidelines contain a specific section articulating agency requirements for incomplete or unavailable information. Section 1502.22 provides as follows:

"When an agency is evaluating significant adverse effects on the human environment in an environmental impact statement and there are gaps in relevant information or scientific uncertainty, the agency shall always make clear that such information is lacking or that uncertainty exists."

"(a) If the information relevant to adverse impacts is essential to a reasoned choice among alternatives and is not known and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.

"(b) If (1) the information relevant to adverse impacts is essential to a reasoned choice among alternatives and is not known and the overall costs of obtaining it are exorbitant or (2) the information relevant to adverse impacts is important to the decision and the means to obtain it are not known (e.g., the means for obtaining it are beyond the state of the art) the agency shall weigh the need for the action against the risk and severity of possible adverse impacts were the action to proceed in the face of uncertainty. If the agency proceeds, it shall include a worst case analysis and an indication of the probability or improbability of its occurrence." (Emphasis added.)

In a number of instances, the DEIS fails to comply with section 1502.22. In some examples, the information is essential to a reasoned choice and the agency is currently in the process of obtaining such information. In these examples, the information must be included in the DEIS and EIS as required by 40 C.F.R. § 1502.22(a). If the agency can not obtain the information, it must weigh the risk of proceeding without it, and must include a worst case analysis as required by 40 C.F.R. § 1502.22(b).

One significant missing piece of information is the traffic separation scheme or other designation of Port Access Routes ("PAR") required by the Port and Tanker Safety Act of 1972. DEIS p. 3-111. The Coast Guard is currently conducting a PAR study for the area included in Lease Sale 53, but it "is unlikely that the routing measures resulting from the study will be established prior to the May 1981 lease sale." DEIS p. 3-11. Nevertheless, the DEIS acknowledges that unless traffic separation scheme is established, the estimated vessel accidents stemming from Lease Sale 53 "could be much higher." DEIS p. 4-165. Since this information will soon be available, it must be included in the EIS as required by 40 C.F.R. § 1502.22(a).

Another significant area where information is missing is the environmental studies which are incomplete. This is significant not only under the CEQ Guidelines and NEPA, but also under OCSLAA. Both NEPA and OCSLAA require planning for leasing based upon the fullest environmental information possible. One of the purposes of OCSLAA was to protect the marine and coastal environment as much as possible while developing the resource potential. OCSLAA §§ 101, 102. The Secretary is required to base timing and location of oil production upon consideration of relative environmental sensitivity, and relevant environmental information. OCSLAA § 18(a)(2)(G), (H). Timing and location of leasing is to be based upon a balance

between resource potential and potential environmental damage. OCSLAA § 18(a)(3). Furthermore, the Secretary is required to conduct environmental studies to establish the necessary information, and must commence such studies at least six months prior to holding the sale. OCSLAA § 20.

As stated in more detail in the comments of the California Division of Mines and Geology, Department of Conservation, offshore geologic hazards present a significant factor influencing environmental impacts of development offshore California. The DEIS recognizes that the geologic hazards are important, but presents no results of any analyses. DEIS p. 4-56 to 4-57. At the time the DEIS was developed, the geologic hazards reports were not completed for any portion of the Sale 53 area. DEIS p. 3-13. In-depth analyses will not be completed until the summer of 1980, and the DEIS table on environmental studies does not contain a final completion date for this study.

DEIS p. 1-55. Pursuant to 40 C.F.R. § 1502.22(a), this geologic information is essential to making a reasoned choice, and the cost of obtaining the information is clearly not exorbitant. Accordingly, the environmental studies on geologic hazards must be completed so that the DEIS can contain a meaningful analysis of this issue.

The DEIS also indicates no final report completion date for the Marine Mammal and Seabird Study. Indeed, the

Draft Final Report is scheduled for June of 1981, after the sale. DEIS p. 1-55. In many instances the DEIS recognizes that little is known about the effect an oil spill would have on marine mammals and seabirds. (See e.g. p. 4-94, 4-96, 4-99, 4-121.) The DEIS and the FEIS must be inadequate without this information. Again, since this information is essential to a reasoned choice and the cost of obtaining it is not exorbitant, it must be included in the DEIS. 40 C.F.R. § 1502.22(a). Nor does the DEIS consider the cost of going forward without this information, as required by 40 C.F.R. § 1502.22.^{2/}

In addition, six of the 1980 studies approved for funding, including the California Seabird Oil Toxicity Study and the Risk Assessment to Protected Marine and Coastal Habitats, do not even show a starting date, let alone a completion date. DEIS p. 1-30. It cannot be determined from the DEIS whether these studies will be commenced in time to comply with the specific requirements of OCSLAA § 20.

2. Instead, the DEIS reaches the apparently unsupported conclusion that "(m)arine mammal and seabird population should not be affected significantly by cumulative OCS activities related to oil spills . . ." DEIS p. 4-119. The apparent basis for this conclusion is the prediction that there will be only 2.29 large spills as a result of Lease Sale 53. DEIS p. 4-117. However, this prediction was made without factoring in the missing geological data discussed above, and thus cannot be regarded as either an appropriate basis for the conclusion stated nor as an adequate "worst-case analysis" as required by 40 C.F.R. § 1502.22(b).

Finally, there are other significant pieces of information missing from the DEIS which are to be included in the FEIS. For example, BLM is currently consulting with USFWS to obtain the biological opinions required by the Endangered Species Act. This will provide information concerning the impact USFWS believes the sale will have on threatened and endangered species. The biological opinions will be included in the FEIS. DEIS p. 1-11. However, as previously discussed, failure to include such information in the DEIS effectively deprives the State of any meaningful opportunity for comment and input, and is contrary to the requirements of OCSLAA §§ 101, 102, 19.

D. Balancing Requirements of OCSLAA and NEPA

California previously commented that the National Leasing Program failed to adequately set forth how the requirements of section 18 of OCSLAA (consideration of 8 specific factors and the balancing requirement) were met. Neither the PEIS nor the material supporting the decision on the program contained a proper balancing analysis between resource potential and environmental impacts, as required by OCSLAA, section 18(c). Proper balancing and consideration of the 8 factors set forth in section 18 must now proceed at the lease sale stage.

OCSLAA section 18(a)(3) requires the Secretary to select the timing and location of leasing "so as to obtain

a proper balance between the potential for environmental damage, the potential for discovery of oil and gas, and the potential for adverse impact on the coastal zone."

The balancing analysis requested is not only required by OCSLAA, but is also required by NEPA. The EIS must provide "a basis for (a) evaluation of the benefits of the proposed program in light of its environmental risks, and (b) comparison of the net balance for the proposed project with the environmental risks presented by alternative courses of action." National Resources Defense Council, Inc. v. Morton (Court of Appeals, District of Columbia Circuit, 1972), 458 F.2d 827, 833. (Emphasis added.)

In addition, section 1502.23 of the CEQ Guidelines requires that the EIS should "at least indicate those considerations, including factors not related to environmental quality, which are likely to be relevant and important to a decision."

Section 1505.2 requires the agency to prepare a public record of decision which shall:

"

"(b) Identify all alternatives considered by the agency in reaching its decision, specifying the alternative or alternatives which were considered to be environmentally preferable. An agency may discuss

preferences among alternatives based on relevant factors including economic and technical considerations and agency statutory missions. An agency shall identify and discuss all such factors including any essential considerations of national policy which were balanced by the agency in making its decision and state how those considerations entered into its decision.

(Emphasis added.)

In short, it must be reiterated that a proper balancing analysis should be provided to the public. If it is not made part of the EIS, it should be contained in some other document which is made available to the public for comment and which becomes part of the administrative record.

See 40 C.F.R. § 1502.1.3/

E. Mitigation

The EIS is required to adequately consider mitigation measures, both under NEPA and the CEQ Guidelines, § 1502.14(f). As pointed out in part A above, the DEIS do not adequately consider reasonable alternatives which would mitigate adverse impacts. In addition, the DEIS fails to

3. "If another decision document accompanies the relevant environmental documents to the decisionmaker, agencies are encouraged to make available to the public before the decision is made any part of that document that relates to the comparison of alternatives." (Emphasis added.)

adequately consider other mitigating measures.

For example, the operating orders applicable to this sale are briefly discussed at p. 1-57 to 1-59. There is no consideration of the environmental effects of these orders or any consideration of reasonable alternative orders.

In addition, the DEIS does discuss the planned lease stipulations (DEIS p. 1-60 to 1-71), but fails to alert the decisionmaker to the probable effectiveness of each stipulation and to reasonable alternative stipulations.

F. Worst Case Analysis

The DEIS recognizes that much is still unknown about certain environmental effects of exploring for oil. Little is known, for example, about the effects of oil ingestion on whales (DEIS p. 4-99) or about the habits of pinnipeds (DEIS 4-94) or how drilling pollutants affect marine food chains (DEIS p. 4-96). NEPA requires that where such information is incomplete, the cost of proceeding without it must be considered in the environmental process, and the EIS must include a worst case analysis. 40 CFR 1502.22(b). No adequate worst case analysis was done in the DEIS, particularly on the cost of proceeding without the completed environmental studies.



United States Department of the Interior

BUREAU OF MINES
2401 E STREET, NW.
WASHINGTON, D.C. 20241

July 1, 1980

Memorandum

To: Director, Bureau of Land Management (542)
Through: ¹⁹⁸ Assistant Secretary--Energy and Minerals *Charles P. Eddy*
From: Director, Bureau of Mines *JUL 8 1980*

Subject: Draft environmental statement, Proposed 1981 Outer Continental Shelf Oil and Gas Lease Sale No. 53, offshore central and northern California

Thank you for the opportunity to review the draft environmental statement for the proposed oil and gas lease sale No. 53. We find the statement to be generally well-written and comprehensive, with scope and detail appropriate to the proposed action. Our brief comments are confined mainly to geology and mineral resources.

Pages 3-7 to 3-11. We are pleased that nonpetroleum mineral resources have been given comprehensive consideration. In this regard, the statement could serve as a model for future reports. The section might benefit, however, from a map showing the general distribution of the minerals mentioned and their areal relationship to proposed leasing areas.

Page 3-8, paragraph 1. The zone of phosphorite deposition is cited as extending from Point Reyes to the mouth of the Gulf of Mexico. We assume that the Gulf of Panama was intended.

Page 4-61, ff. A brief discussion of any anticipated impact on nonpetroleum mineral resources should be included under the heading "Probable Impacts of the Proposed Action."

Ch. Henderson
Acting Assistant Director



United States Department of the Interior

FISH AND WILDLIFE SERVICE
WASHINGTON, D.C. 20240

ADDRESS ONLY THE DIRECTOR
FISH AND WILDLIFE SERVICE

2

Page 3-93, line 8: Platichthys should read Pletichthys.

Page 3-88: The commercial fisheries section is quite good and might be used as a "format" to present information in other biological segments (marine mammals, bottom habitats, inshore communities).

Table III, C-1, page 3-144-145: Several sections are blank. If no information is available it should be so indicated.

Page 4-21, para. 2: Some quantitative indication of the level of impact should be included.

Page 4-59, para. 3, 4: What is the risk of a major oil spill in the tankering plans described in Transportation Scenarios 2 and 3?

Page 4-94, line 10: What are the long-term sublethal effects?

Page 4-95, line 7: What percent of the total population does the 100+ dead sea otters represent?

Page 4-107, para. 2: This should note that the snowy plovers are decreasing in abundance, and possibly should now be considered for "Threatened Status". Loss of their remaining undisturbed habitat may have significant adverse impacts to remaining populations.

Page 4-152, para. 3: This particular vulnerability of salmonids is of concern, especially where impacts may be on Salmon and Steelhead Trout of the San Joaquin River Basin and the Klamath River Basin.

Page 4-196, para. 2: What are the total numbers, or value, of those resources that may be sacrificed?

Additional comments prepared by the National Fish and Wildlife Laboratory, San Simon, California have been sent directly to the BLM, OCS Manager, Los Angeles. The comments provide additional information and reference along with the suggestion that Alternative 3 concerning tract deletions for the protection of sea otters be combined with Alternative 2 which deals with air quality.

We hope these comments will be of some assistance to you in the preparation of the final impact statement.

cc: Directorate Reading File
DD chron
AZ

ES/Matthews:ru 7/2/80 ext. 5733

Memorandum

To: Director, Bureau of Land Management
From: Director, Fish and Wildlife Service

Subject: Draft Environmental Impact Statement (DES) for the Proposed Outer Continental Shelf (OCS) Oil and Gas Lease Sale No. 53

We have reviewed the subject document and offer the following comments for your consideration in the preparation of the Final Environmental Impact Statement.

General Comments

Although the DES is generally adequate, we feel there is insufficient treatment of the following biological categories: sea otters; plankton; impacts on food chains; effects of petroleum products on salmonid fishes; and the long-term, sublethal effects of effluents on biological resources. We feel the Final Environmental Impact Statement should provide a greater degree of specificity, information on the anticipated general disturbances to these resources, and a balanced evaluation of the cumulative impacts to these resources from the proposed development activities. Even though some of the information analyzed for these categories is acknowledged in the DES as inconclusive, the significance of the anticipated impacts are stated as unequivocally local or short term.

The resources protected by National Wildlife Refuges (NWR) within the project area are mentioned in most cases; however, there is no mention of the specific refuges. The list includes: Humboldt Bay NWR; Farallon Island NWR; San Pablo Bay NWR; San Francisco Bay NWR; and Elliott Slough NWR.

Specific Comments

Page 1-60, lines 8-10, should be changed to read: "If the supervisor has reason to believe that special biological communities or species of such extraordinary or unusual value (even though unquantifiable) exist on a lease, and no threat of. . ."

Page 3-41, Biological Oceanography: This section should address the contribution to the biological community by phytoplankton and zooplankton. How important are they? What is their value?



United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VA. 22092

JUL 1 1980

Memorandum

To: Director (542), Bureau of Land Management
Through: Assistant Secretary--Energy and Mineral Resources
From: Director, Geological Survey
Subject: Review of draft environmental statement for OCS Sale No. 53, offshore central and northern California

Charles P. Eddy
JUL 8 1980

We have reviewed the draft statement as requested in your memorandum of March 31.

We call attention to new information on shallow faulting, to changes in USGS orders and stipulations, and to clarifications needed in terminology of estimates of oil and gas resources.

We also recommend further consideration of the role of geologic processes in affecting cultural sites, for which our staff is available for consultation, and we suggest that the significance of identified sites be evaluated.

These concerns and others are presented in the enclosure.

George H. Brown
for H. William Menard

Enclosure



One Hundred Years of Earth Science in the Public Service

OCS Sale No. 53

USGS Comments

Page 1-14, 2.b., sentence 1. This should read " . . . Conservation Division, Los Angeles, California"

Page 1-14, 2.b. Delete the words "most probable." "Most probable" is not the same as "mean."

Page 1-17, par. 2. Delete "most probable," as above.

Page 1-19, par. 1. Delete "most probable," as above.

Page 1-19, sentence 1. This should read " . . . with the maximum total daily production occurring in 1990 for most of the areas."

Page 1-31, par. 2. "The act as amended, provides guidelines for implementing an OCS oil and gas exploration and development program."

Page 1-32, par. 1. This paragraph is unclear. Regulations administered by the Geological Survey govern the conduct of lease operations. These regulations are contained in 30 CFR Part 150 and are implemented by OCS Orders for specific areas.

Page 1-37, item b. Add to the end of this item: "the State's concurrence has not been conclusively presumed, or the State objects to the consistency certification, and the Secretary of Commerce does not make the determination authorized by section 307(c)(3)(B)(iii) of the Coastal Zone Management Act."

Page 1-41, par. 2. Reword as follows: "USGS administers regulations governing lease operations, including exploration and development of the DCS under CFR Part 250. These regulations are the basis for OCS Orders which apply to operations in the proposed lease area. See appendix D for a discussion of USGS Orders (effective January 1, 1980) for this proposed lease area."

Page 1-42, lines 3-4. "The final regulations, to be effective June 2, 1980, have been published and will be codified as 30 CFR 250.57."

Page 1-49, first full par. Does this paragraph describe Sale 53 or Sale 46?

Pages 1-57-59. In the discussion of OCS Orders, the term Operating should be deleted. We also suggest that each OCS Order be titled: No. 1, Identification of Wells, Platforms, Structures, Mobile Drilling Units, and Subsea Objects; No. 2, Drilling Operations; No. 3, Plugging and Abandonment of Wells; No. 4, Determination of Well Production; No. 5, Production Safety Systems; No. 6, Procedures for Completion of Oil and Gas Wells; No. 7, Pollution Prevention and Control; No. 8, Platforms and Structures; No. 9, Approval Procedures for Pipeline; No. 10, Drilling of Twin Core Holes; No. 11, Oil and Gas Production Rates; No. 12, Public Inspection of Records.

Pages 1-60-71, Stipulations. In the discussion of the cultural resource stipulation (pp. 1-62 and 1-63), the report of the marine archeologist is not submitted directly to the Bureau of Land Management, but to the Supervisor.

We believe that the geological stipulation is redundant in that it prescribes measures already required by OCS regulations, Orders, and Notice to Lessees 77-2. GS routinely requires site-specific surveys, evaluates all geological hazards, and reviews exploration and development plans for safety and environmental protection prior to approval.

The pipeline stipulation emphasizes the required development of pipelines in areas lacking pipelines and facilities to accommodate onshore flow of oil and gas. The decision to construct such pipelines is an economic and environmental one and should be made when and if development and production are proposed. Alternatives to pipeline transportation (tankering and barging) may be more flexible, less environmentally damaging if properly planned, and more economical than pipelines. If a stipulation of this type is included as a condition of the final lease sale, there should be stronger emphasis on economics and environmental protection as controlling factors in the decisionmaking process.

We also believe that the wells and pipelines stipulations are redundant. The requirements of these stipulations are covered by OCS Orders No. 1 and No. 9 and mitigation measures (Fisherman's Contingency Fund) already in effect.

Page 1-63, c., sentence 1. Add "... if USGS has identified any shallow geologic features which pose a threat to oil and gas activities."

Page 1-64, sentence 4. Delete "Down-hole pressure actuated control devices must be located below the base of the potentially unstable sediments located in the area in order to protect the environment in case such mass movement occurs at the proposed location."

Pages 1-64, 65. Delete the last paragraph beginning on page 64. USGS does not necessarily request a stipulation for faults.

Page 1-75, last par. This should read: "Regulations have been published by the . . ."

Page 1-78, line 6 up. In the phrase "directly affecting land and water uses," delete "directly." This more accurately reflects the language of the Coastal Zone Management Act with respect to Outer Continental Shelf (OCS) activities.

Page 2-11, (1). Visual No. 8 does not provide the reader with any substantive data. The "shipwreck zones" are not clearly defined as to significance. It is unlike similar charts for OCS Sales 48 and 55 in that zones of high, medium, and low probability are not clearly defined as it stands. Does this chart reflect all 1,276 identified vessels, or are these significant sites? If based on the former figure, we recommend establishment of a system for evaluating these potential sites and determining if they will be identifiable by

remote sensing techniques available. The "aboriginal remains" line does not allow for variations of physical processes along a 400-mile coastline. We recommend a much more detailed analysis of the geologic processes that have occurred along this extensive coastline, as well as an analysis of their impacts on potential cultural sites of the area. We would suggest consideration of sedimentation rates, erosional factors, tectonics (this area is extremely active), or any other physical process that might affect the possibility of site preservation. As the USGS has expertise in these areas and a vital interest in the sale, it might be beneficial if BLM were to consult with our staff.

Page 2-12. We question why deleting part of the Santa Cruz and Santa Maria area to improve air quality is suggested as an alternative. The Department of the Interior (DOI) OCS air quality regulations will mitigate impacts on these areas and still allow the recovery of the oil and gas. The impacts of this proposed alternative might well be reconsidered in view of the DOI regulations.

Page 3-87, lines 7-9. This should read "USGS estimates that oil and gas reserves included in all presently leased areas total 695 million barrels of oil and 1,575 billion cubic feet of gas, and resources total 394 million barrels of oil and 1,295 billion cubic feet of gas."

Page 3-87, lines 9-12. Delete the sentence, "USGS further estimates . . . at that time." These estimates are inaccurate because they are based on combined estimates of reserves and resources and include estimates for a tract which was bid on, but later rejected, in Sale No. 48.

Page 4-2, par. 2. This should read "To determine cumulative OCS impacts, the risked mean reserve and resource estimates of oil in millions of barrels was also determined for the existing Federal OCS leases in southern California illustrated on figure IV.A.1-2. The reserve estimate for Santa Barbara and San Pedro is 695, and the resource estimates by area are as follows:

"Santa Barbara Channel	152	(E1)
Santa Rosa Island	10	(E2)
Santa Barbara Island	15	(E3)
Tanner/Cortes Bank	181	(E4)
San Pedro	36	
Total	394	

This change is required because the DEIS used a USGS report that contained obsolete and incorrect figures as a source for these Southern California estimates.

Page 4-34, par. 2. OCS Order No. 7 no longer addresses the discharge of drilling muds. The Environmental Protection Agency (EPA) through its NPDES permit program regulates drilling-mud discharges.

It should be noted that the USGS recently (July 3, 1979) banned the use of bactericides containing halogenated phenols used in OCS drilling and reinjection activities.

Page 4-37, Sewage. OCS Order No. 8 no longer addresses sewage discharges on the OCS. The EPA through its NPDES permit program regulates sewage discharges.

Page 4-43, lines 2-3. The draft statement states "The mitigating effects of these new (DOI OCS air quality) regulations will be considered in the FEIS." We suggest that the entire statement should be updated to reflect the final DOI regulations, as necessary.

Page 4-44, Table IV.A.5.b.ii-1. This should include a summary of the amounts of reactive hydrocarbons. If only reactive hydrocarbons are considered, nitrogen oxides become the pollutant emitted in the largest quantity.

Page 4-51. The numerical comparison of offshore and existing onshore emissions of HC, NO₂, and SO₂ should be provided.

Page 4-62. The impact analysis is very conservative, assuming worst case emissions, worst case meteorology, worst case location, etc. In most analyses, no emission controls were assumed. This should be emphasized strongly to ensure that the casual reader will understand the hypothetical nature of the cases evaluated.

The DOI OCS air quality regulations will require emission controls for adverse impacts. To show the range of onshore impacts, a more realistic evaluation, assuming probable control measures, should be included.

Page 4-63. The hypothesized onshore gas plant which would service the Santa Maria Zone would exceed a designated Prevention of Significant Deterioration standard. This hypothetical situation is unrealistic; State and local jurisdictions would not issue a permit for such a plant.

Page 4-73, last sentence. This needs clarification; perhaps the last word of the sentence should be "available."

Page 4-75, par. 2. See comment for page 4-37.

Page 4-76, par. 1, and page 4-86, par. 4. These two statements on the effects of drill mud and cuttings on the benthos are inconsistent. The first reference states that mud and cuttings could smother bottom biota. The second reference states that most of the benthic life will be buried by mud and cuttings falling near the platform.

Pages 4-109-113, Endangered Species. It is indicated (pp. 1-11 and 4-113) that the Bureau of Land Management and the Geological Survey are consulting with the Fish and Wildlife Service and the National Marine Fisheries Service to determine what impact they believe the proposed lease sale could have on threatened and endangered species. We suggest that the impact on endangered species of both exploration and development should be considered together. Special concern about the impact of oil spills on sea otters is expressed in the draft statement (pp. 4-112 and 4-117). While spills are very unlikely

during the exploratory phase, the probability increases during development, production, and transportation (p. 4-113). We are concerned with the possibility that exploratory activities on a lease would be allowed, but "jeopardy decisions" from endangered species consultations could prevent later development or production. Since such a situation may be possible, or even probable, it should be fully addressed in the final statement.

Pages 4-167-178, Cultural Resources. We find that the discussion of impacts on archeological and cultural resources overemphasizes the negative aspects of OCS development. It should be mentioned that benefits also accrue, since without OCS oil and gas exploration, little archeological or cultural research would be likely to occur in the offshore area.

Great concern about anchor drag is expressed in this section. Anchor drag will impact only relatively small areas of the ocean bottom. The 30,000-pound anchors of a drillship are carried by workboats to the proper position and dropped vertically to the ocean floor. The anchors take hold with little dragging. Tension on the lines is maintained during drilling in order to maintain position over the drill hole. Anchors, chains, and cables do not drag or continually gouge the bottom. Upon completion of drilling, the workboats again are deployed to positions over the anchors, the chains are slackened, and the anchor is lifted. It was found by Ecomar in the Tanner Bank Study that mooring damage was slight, affecting less than .02 percent of the area encompassed by the 8-point anchor pattern used to hold the semisubmersible platform in place.

Pages 4-188-189, Water Quality. We disagree with the statement that water quality will be degraded up to 20 km from platforms due to chronic spills and discharge of formation waters. Discharge from drilling vessels and platforms are strictly controlled by OCS Order No. 7 and the Clean Water Act, administered by the Environmental Protection Agency. Also, note should be made that formation water is not produced during exploratory drilling. During well drilling, oil-free, nontoxic muds, cuttings, and fluids are discharged to the ocean or are barged to shore. A study conducted by Ecomar on Tanner Bank indicated discharge of drill muds, fluids, and cuttings caused water degradation over only a limited area, with background levels for contaminants being reached within 200 m from the source. Conditions of this study were relatively typical for an exploratory well. After installation of a platform and production begins, formation water is usually reinjected or discharged under an Environmental Protection Agency permit and, therefore, should not be a problem.

Page 4-195, sentence 2. This should read "The U.S. Geological Survey estimates net recoverable resources (risked mean) of"

Page 7-3, lines 6-8. Delete "As a result of this process, an additional stipulation was developed which deals with geologic faulting." USGS has not recommended application of a lease stipulation because of faulting in the Sale No. 53 area.

Visual No. 10. Information released in mid-March may permit refinement of shallow faulting as shown in the southeastern corner of the map (from Point Arguello to the southeast). The following publication contains pertinent information on a new interpretation of the geologic structure and seismicity of the northwestern Santa Barbara Channel region, part of which is included on Visual No. 10: Yerkes, R. F., Greene, H. G., Tinsley, J. C., and Lajoie, K. R., 1980, Seismotectonic setting of Santa Barbara Channel area, Southern California: U.S. Geological Survey Open-file Report 80-299.

For example, the report describes one young fault that has been traced almost continuously for more than 85 miles from west of Point Conception to Ventura, part of a fault system whose underwater trace is interpreted to be the Arguello-North Channel Slope, which lies about 3 to 4 miles offshore and stretches about 60 miles from Point Arguello to Santa Barbara. Such an alignment would lie about 1 mile north of the 100-fathom line, which is shown on Visual No. 10 at least from Point Conception eastward to the edge of the map, but no such fault alignment is shown on that map.

POCS Reference Paper 53-5, page VI-60. The last sentence states "DOI significance levels for 24-hour SO_2 and TSP increments could be exceeded" This statement conflicts with page VI-27, which states "TSP and SO_2 concentrations for all Lease Sale No. 53 emission scenarios would be below the proposed SO_2 significance level" We assume that page VI-60 refers to both onshore and offshore emissions. The DOI significance levels should apply to effects from offshore emissions only.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUL 7 1980

OFFICE OF THE
ADMINISTRATOR

Mr. Frank Gregg, Director
Bureau of Land Management
U.S. Department of the Interior
Washington, D.C. 20240

Dear Mr. Gregg:

The Environmental Protection Agency (EPA) in accordance with its responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act, has reviewed the Bureau of Land Management's Draft Environmental Impact Statement (DEIS) on the Proposed 1981 Outer Continental Shelf (OCS) Oil and Gas Lease Sale offshore central and northern California. We have enclosed specific comments which address our concerns in detail.

The proposed sale includes a maximum offering of 243 tracts comprising 532,588 hectares (1,316,025 acres) on the Federal OCS. The area ranges seaward from 3 to 27 miles, in water depths from 50 to 750 meters in five distinct sedimentary basins from offshore Humboldt Bay to Point Conception.

Because this is a frontier area with extremely valuable living resources, productive ecosystems, recreational and other resource values, it is essential that the environmental characteristics and potential risks be as well documented as possible. We are particularly concerned that there are a number of important information elements not included in the DEIS. We believe that substantial addition of new material and revisions of the DEIS must be made to allow for fully informed decision making regarding controls and alternatives for this sale.

In addition to the data deficiencies, we believe the discussion of alternatives does not give an adequate rationale for the selection or rejection of sale modification alternatives. The FEIS should detail a fuller range of tract deletion alternatives, and fully document any that are rejected as causing insignificant impact.

-2-

Finally, we believe the FEIS should clearly acknowledge the requirements of section 176(c) of the Clean Air Act for a determination of conformity with the applicable state implementation plan (SIP). Under the interim procedures outlined in the April 1, 1980 advance notice of proposed rulemaking and the letters to other federal agencies, determinations should be made once the SIP revisions required by Part D of the Clean Air Act are approved or conditionally approved. The California Part D SIP revisions have not yet been approved. The approval may, however, occur before the OCS Lease Sale No. 53 final environmental impact statement (FEIS) is completed. If the California SIP is approved or conditionally approved prior to the FEIS, then the FEIS should include a determination that OCS Lease Sale No. 53 conforms to the requirements of the California SIP.

In view of the data and analysis deficiencies we have identified, we have rated this DEIS Category ER-3, environmental reservations, inadequate information. Thank you for the opportunity to comment on this draft statement.

Sincerely yours,

William N. Hedeman, Jr.
Director
Office of Environmental Review (A-104)

Enclosure

Specific Comments on DEIS
for
Proposed OCS Lease Sale #53

-2-

Air Quality

1. The DEIS does not adequately address the air quality impacts of Alternative Two which establishes a six-mile coastal buffer zone in the Santa Maria and Santa Cruz lease tracts.

The assumption that an emission reduction would occur in proportion to the area deleted is questionable because the tracts in the buffer zone have a low resource potential. More specifically, the DEIS states that the effect of relocating sources to six miles from shore would reduce onshore worst case impacts by approximately 50% for both the Santa Maria and Santa Cruz tracts (page 2-14). There is, however, no technical analysis of the pollutant concentrations that can be expected from relocating sources. The Final Environmental Impact Statement (FEIS) should reevaluate the emission reductions that can be expected with this alternative.

2. The DEIS also suggests that, in some instances, atmospheric dilution resulting from increased source-receptor distance may not significantly reduce oxidant impacts. This is of concern since the Department of Interior's OCS air quality regulations (45 FR 15128, March 7, 1980) have a distance exemption formula that can allow increased emissions of oxidant precursors at increased distances from shore. This exemption also tends to encourage moving operations further offshore. The DEIS (p. 4-43) notes that the mitigating effects of DOI's new regulations will be considered in the FEIS. In the FEIS, the assessment of the affect from these new regulations should include a projection of the increased uncontrolled and unmitigated emissions from OCS facilities that are considered to be less than the "significance level" because of the DOI dispersion criteria. In addition, the FEIS should assess the cumulative impact of the increased emissions from minor uncontrolled onshore sources, such as tanker unloading and refining facilities.

3. The DEIS indicates in the section on the "future environment without the proposal" (p. 3-147) that "some recent data" projects that the attainment of national ambient air quality standards (NAAQS) for Los Angeles and San Francisco by the required date of 1987 is "less certain." We believe that this finding

is inconclusive and, in any case, is unsubstantiated by the DEIS. It also compromises the evaluation of the onshore impact of increased air pollution emissions by minimizing the significance of the OCS emission contribution to delaying attainment of the NAAQS by the required date.

4. The air pollution emissions inventory (p. 4-42) conducted for the DEIS overlooks the impact of the increased emissions on the efforts of the state of California to attain the NAAQS by the required date. The DEIS emissions inventory should reflect the impact of the increased emissions associated with OCS Lease Sale No. 53 on future onshore emissions levels. There is no correlation provided in the DEIS between the emissions growth rates associated with OCS Lease Sale No. 53 and that used for the California SIP. Further, the DEIS does not indicate whether the increased emissions resulting from OCS Lease Sale No. 53 will conflict with the emissions reduction requirements of the California SIP. The FEIS should contain estimates of the size and locations of population increases, refinery expansions and tanker off-loading operations induced by OCS Lease Sale No. 53 and discuss the air quality impacts associated with this induced growth.

5. The DEIS finds that the increased emissions from OCS facilities could:

- a) cause a violation of the NO₂ NAAQS for the Santa Cruz and Santa Maria onshore areas (p. 4-64);
- b) delay attainment of the ozone NAAQS for Bodega Bay, Santa Cruz and Santa Maria onshore areas (p. 4-72);
- c) delay attainment of the TSP NAAQS in the Santa Maria onshore area (p. 4-63); and
- d) exceed the prevention of significant deterioration (PSD) increment (presumably Class II) for SO₂ in the Santa Maria, Eel River, Point Arena, and Santa Cruz onshore areas (p. 4-63).

These predictions conflict with the DEIS summary finding that "some small deterioration of onshore air quality will occur" (p. 4-188). The realization of any of these predictions would

be inconsistent with the NAAQS attainment and maintenance goals and requirements of the Clean Air Act. Since these predictions are based on an analysis that assumes no mitigation measures, the FEIS should include an in-depth analysis of the effectiveness of existing air quality rules and regulations in mitigating adverse air quality impacts associated with Lease Sale No. 53. This should include both the finalized DOI OCS regulations and the proposed DOI OCS regulations applicable only to the California OCS (45 FR 15147, March 7, 1980). If existing controls over OCS-related air pollutant emissions are found to be potentially inadequate in negating significant contributions to National and State Ambient Air Quality Standards, additional controls should be proposed (e.g., a lease condition that requires hydrocarbon vapor recovery during tanker loadings at offshore storage and treatment facilities).

6. We cannot concur with DOI's presumption that because of the "temporary nature" of air quality impacts, it is "unlikely" that it would affect human health or property (p. 4-188). Any contribution of increased emissions from OCS facilities that will delay the attainment or prevent the maintenance of the national ambient air quality standards (NAAQS) must be presumed to have a negative effect on human health and property.

Water Quality

1. There are several places in the statement where EPA's authority over discharges from offshore operations should be clarified. The discussion on page 1-48 should include EPA's authority over mobile drilling rigs, as well as fixed platforms and drill ships. Similarly p. 4-34 should specify that special conditions concerning the discharge of drilling muds and cuttings may be included in EPA's National Pollutant Discharge Elimination System (NPDES) permits. Page 8-2 should be corrected to indicate that EPA has authority over all classes of polluting discharges, not just those prior to the commencement of well drilling.

2. The proposed Sale may include tracts in waters as deep as 750 meters. EPA has consistently recommended that where increasing water depths will tend to exceed the capability of conventional platform development modes and likely encourage the use of new subsea facilities, such facilities should be covered by specific regulations. Such regulations should include minimum standards for installation operation, maintenance, removal, and accident contingencies for generic types of subsea systems. We urge the Bureau to pursue with Geological

Survey the development of formalized controls for this growing technology.

The FEIS should indicate the number of tracts occurring within various isobaths (graphics include no bathymetric measures) and the possible environmental impact that could result from higher risk operations in deepwater tracts.

3. Section IV.a.1 of the DEIS and page 18 of the Reference Paper No. 53-2, "Oil Spill Risk Analysis," do not adequately discuss the potential impacts on water quality of a significant seismic event (including seismically generated sea waves) on platforms, pipelines and subsea drilling facilities. Such seismic movement could cause a blowout or a break in a pipeline which would have an adverse effect on the water quality of the marine environment, not only in the immediate area but also from the movement of a major oil spill. EPA believes that it is essential that the results of the geological hazards study and the attendant implications on water quality be included in the FEIS.

4. The impact statement (p. 1-19 et. seq.) describes various projected transportation modes for produced hydrocarbons from each of the five basins. This discussion includes no rationale for the selection of barging/tankering for oil produced from two of the basins. Since one of the sale mitigation measures indicates that pipelines will be the preferred transport mode for oil, the justification for the selection of barging and tankering should be presented.

5. Section IV.A.1 of the DEIS discusses the Oil Spill Risk Analysis Model. The model, as designed, can provide very detailed analysis of the probable risk of an oil spill; however, the accuracy of such a model depends upon the information fed into it. The Preliminary Draft of the California OCS Environmental Studies Plan (May, 1980) indicates that much of the necessary information is not yet available, including a Summary and Analysis of Available Physical Oceanographic and Meteorological Data for Offshore California and the Northern California Meteorological Buoy Placement for Offshore Wind Data. Because of this incomplete data, results from the Oil Spill Risk Analysis Model may be seriously deficient. Deficiencies in the model results could be critical, since the impact analyses in the DEIS are based on the results from the model. The Environmental Consequences section of the FEIS should reflect the limitations of the predictive capabilities of the oil spill model.

6. Section IV.B.2., Impacts on Marine and Coastal Ecosystems, does not fully address the impacts on water quality. Areas of Special Biological Significance that stretch from Point Arena in the north to Pismo Beach in the south (designated in the Water Quality Control Plan for Ocean Waters of California, 1976) may be specially sensitive to degradation of water quality resulting from oil spills and other effluents associated with OCS petroleum hydrocarbon development. For these same reasons, the FEIS should also provide more detail about the ecosystem values which are within the proposed Pt. Reyes/Farallons Islands Marine Sanctuary.

The DEIS states that the proposed Monterey Bay Marine Sanctuary and Elkhorn Slough Estuarine Sanctuary are not likely to be affected by projected OCS hydrocarbon development (page 4-199). This conclusion is based on the oil spill model with its present data input. In light of the predictive limitations with the present data, it is not clear that such valuable marine and estuarine resources are "relatively safe" from the affects of an oil spill.

Also in Section IV.B.2., the DEIS states, "Species not expected to suffer high long-term impacts from oil spills are cetaceans, pinnipeds, and birds (except at localized areas), plankton, terrestrial plants and animals, and kelp." (page 4-117) This statement should be qualified with the notation that several BLM OCS studies covering this subject have not yet been completed (including Marine Mammal and Seabird Survey of Offshore Central and Northern California, California Seabird Oil Toxicity Study and Central and Northern California Risk Assessment to Protected Marine and Coastal Habitats).

7. In Section IV.B.4., the DEIS states; "The time involved for cleanup operations depends entirely on the size of spill, the extent of shoreline impacted, the effectiveness of the absorbers and cleanup equipment, the type of shoreline impacted, the accessibility of the impacted area, the speed of the response team, and the weather. The probability of these spills occurring, if they do occur, during the major tourist season is 20 percent, thus, the greatest probability is for the spills to occur during the low use periods and in periods of poorer weather conditions." (page 4-145) While this statement may be a valid assessment of the impacts on recreation, the frequency of "poorer weather conditions" and the fact that the closest oil spill response equipment is located in Long Beach and San Francisco, "too far away to provide immediate response to the proposed Sale No. 53 tracts" (page 1-72), appears to indicate that water quality impacts will not be properly mitigated. The FEIS should discuss more completely the mitigation of oil spills and contain assurances that the implementation of mitigation measures will take place.

8. Section III.D.1 of the DEIS states; "The lessening of detrimental impacts as a result of having one fewer oil spill within 30 years is probably insignificant. The main exceptions may be to an estuary or wetland if a large spill were to enter it and remain for several days." (page 3-148) The Central and Northern California coast is dotted with estuaries, wetlands and marine sanctuaries. The assumption that the proposed OCS development will not cause any additional significant impacts because there is already the possibility of such an event is not a valid mitigating device or rationale for the project. The presence or lack of an existing hazard is not a valid reason for underestimating the potential impacts of a proposed action. The FEIS should reevaluate this conclusion.

9. Section IV.B.5 of the DEIS states that, "salmon and other anadromous fish are particularly vulnerable to oil when they first enter the sea as young and later when they return to spawn." This statement indicates the severity of impact on water quality and the related beneficial uses; however, the DEIS fails to identify appropriate mitigation measures for the potential economic and environmental losses. The FEIS should discuss appropriate mitigation measures, including spill control technology, more completely.

10. Section IV.B.1 of the DEIS states; "Many of the chemical and physical properties transferred to the ocean during oil and gas development and production represent waste that will degrade the water quality." (page 4-74) The discussion that follows seems to indicate that these impacts will be temporary. EPA is concerned about the term "temporary" in describing water quality impacts from a project that is anticipated to begin in 1986 and continue until 2005. The DEIS uses two years as a time frame for long term effects. Given a twenty year project period, this definition of long term is inappropriate. The FEIS should include a discussion of both the short term and long term effects of this project.

The DEIS states that the "magnitude is not known" of the impact of the discharges of drilling muds and produced water (page 4-74), and that "Although long term sublethal effects from drilling muds and cuttings are possible, no studies have been found which show sublethal effects..." (page 2-3 et. seq). The FEIS should document what studies have been done and what studies are contemplated to answer this important question. In addition, you should be aware that there has been evidence presented in the public sector that indicates that there are long term, sublethal effects associated with drilling muds and cuttings (For example, papers presented at the Drilling Muds Symposium in January, 1980 in Lake Buena Vista, Florida).

11. On page 4-79, the DEIS states that concentrations exceeding 300 picocuries per liter of radium were detected in the formation waters from several wells in the Gulf of Mexico. These levels are several times higher than discharges of the same radionuclides from a land-based radiation facility. Although the DEIS notes that, "to date, no information has been found that documents radium level in formation water from California OCS formations," it is unclear whether there exists an ongoing program to detect potentially hazardous levels of radium. The FEIS should clarify this issue.



United States Department of the Interior

HERITAGE CONSERVATION AND RECREATION SERVICE
WASHINGTON, D.C. 20240

IN REPLY REFER TO:

DES 80/24

84

MEMORANDUM

To: Director, Bureau of Land Management
From: Director, Heritage Conservation and Recreation Service
Subject: Review of Draft Environmental Statement for Proposed 1981 Outer Continental Shelf Oil and Gas Lease Sale No. 53

We have reviewed the subject document and offer the following comments for your consideration.

General Comments

We believe that the document does not adequately address the potential loss of significant natural, biological, and cultural resources that combine to make the central and northern California coastal zone a unique and valuable resource worthy of maximum protection efforts. Discussion of the Federal Coastal Zone Management Act and the California Coastal Plan is confined almost exclusively to a recitation of compliance and coordination procedures, with minimal reference to goals and policies of each.

We suggest that the document include a description of the many unique features of the California coastal zone as well as the "Major Findings and Policy Recommendations" in the California Coastal Plan.

Specific Comments

Potential adverse impacts on significant natural resources included in a program administered by this Service, the National Natural Landmark Program, is not specifically addressed in the draft environmental statement. National Natural Landmarks are nationally significant representative examples of the Nation's natural history (ecological and geological resources).

At present Point Lobos in Monterey County, Nipomo Dunes-Point Sal in Santa Barbara County, and the Audubon Canyon Ranch in Marin County are National Natural Landmarks located on the central California shoreline. Five other sites, Hopkins Marine Reserve and Monterey Submarine Canyon Complex (both in Monterey County), Montana De Oro-Point Bushon (San Luis Obispo County), Ano Nuevo Point and Island (San Mateo County), and the Farallon Islands (San Francisco County) have been found eligible and are being considered for addition to the National Registry of Natural Landmarks. We have enclosed briefs and maps for these sites.

Oil spills or development of on-shore treatment facilities adjacent to landmarks could represent significant damage or threats to their integrity. The environmental statement should address the potential adverse impacts on these landmarks from the leases proposed and related on-shore development.

Location of On-shore Treatment Facilities

Page 3-150, reports that the California Coastal Plan will direct future industrial development to areas already designated as industrial. Identification of potential sites for on-shore oil and gas treatment facilities in the final statement would be helpful. Potential sites could then be surveyed for cultural, biological, or other significant resources while predicting conflicts with adjacent land uses.

Important recreational and park lands along the California coast should also be excluded from potential on-shore treatment facility sites. Some State or Local coastal parks may have been developed with matching Land and Water Conservation Act grant funds. Taking of such properties for non-recreational purposes would require approval by the Director of this Service.

Harold Green
For Chris Therral Delaporte

1. Site: Nipomo Dunes-Point Sal Coastal Area, San Luis Obispo and Santa Barbara Counties, California
2. Description: The landmark is basically comprised of two contiguous areas. The Nipomo Dunes area in the north contains the largest, relatively undisturbed coastal dunes tract in California. Further south, the Point Sal area is one of the last remaining tracts of pristine, rocky coastline in the South Coast Ranges. The site includes about 18 miles of shoreline, extending inland about 3½ miles near the center and encompassing approximately 15,900 acres. This site is biologically, geologically and scenically outstanding. Five major plant communities are represented here including Strand, Coastal Sage Scrub, Grassland Association, Freshwater Marsh Community and a special Willow-Wax Myrtle Association. The cliff vegetation in the Mussel Rock and Point Sal area is also noteworthy due to its well preserved condition. A series of undisturbed freshwater lagoons and lakes also occur in the northern Nipomo Dunes area. Eight plant species are endemic to the landmark site and 6 more occur at only one other location, which is presently being developed. Many plant species also reach their northern or southern distributional limits here. The flora is almost totally native with only very few intrusive weeds or introduced species. The diversity of relatively undisturbed habitats provides for abundant wildlife common to California. Especially noteworthy is the bird fauna representing over 100 species several of which are uncommon, rare or endangered including the American peregrine falcon, the California least tern, and the white tail kite. One variety of kangaroo rat endemic to the Nipomo Dunes-Morro Bay coastal area is found here. The intertidal invertebrate life is also abundant on the rocky shores around Point Sal. Lion Rock, located about 200 yards off Point Sal, is a nesting place for pelicans and cormorants. As many as 600 sea lions have been counted here at one time, and seals are occasionally observed. Geologically, Nipomo Dunes possesses excellent representation of various dune types of 3 different ages. The dunes reach 500 feet in height just north of Mussel Rock. There are 3 large natural bridges in the Mussel Rock area plus several smaller ones. In addition, geological exposures on the fringes here and at Point Sal illustrate submarine lava flows, basaltic intrusions and Pleistocene sea level fluctuations. Although not unique to the landmark, these features are well preserved. The landmark extends from the city of Pismo Beach south to the northernmost section of Vandenberg Air Force Base.
3. Owner: The State owns two small land tracts, Pismo Beach State Park and Point Sal Beach State Park; the counties own several small tracts; the U.S. Government owns one small tract; the remaining land is divided into a multitude of privately owned parcels.

4. Proposed by: University of California, Davis in the South Pacific Border natural region theme study. Principal investigators were: Ledyard G. Stebbins, Department of Genetics, and Dean W. Taylor, Department of Botany; and Jere H. Lipps, James R. Correa and Gary Zumwalt, Department of Geology and Institute of Ecology.
5. Significance: The Nipomo Dunes-Point Sal Coastal Area contains the largest, relatively undisturbed coastal dune tract in California and one of the last remaining tracts of pristine rocky coastline in the South Coast Ranges. Five major plant communities are well represented and the flora exhibits the highest rate of endemism of any dune area in western North America. Dune succession is exceptionally well displayed. No comparable area on the Pacific Coast possesses a similar series of freshwater lagoons and lakes so well preserved, with minimal cultural intrusions and harboring such great species diversity. The area serves as habitat for both rare and endangered plants and animals besides being one of the most scenically attractive areas in southern California.
6. Land use: Dune buggy rallies, clam festivals, horseback riding, fishing, hiking, etc., are active pursuits. Memorial Day weekend in 1971 saw an influx of 7,000 cars and campers on the beach in the Pismo Beach area. A dune buggy rally on the July 4 weekend, 1972 drew an estimated 50,000 people on this beach in one day. There is no charge to enter the beach. Presently, four State Ranger vehicles are used to patrol Pismo Beach State Park. Drinking water, garbage collection, beach clean up and toilet facilities are very inadequate. The California Division of Parks and Recreation plans to improve some of these maintenance and sanitation needs in the State park.
7. Dangers to integrity: The action of dune buggies continues to be the greatest hazard to the environment. More active restrictions are necessary to restrict off-the-road vehicle traffic. Dune buggies are constantly expanding their sport into remote dune areas, destroying fragile vegetation and archeological sites. Thousands of young clams, crabs, and other invertebrates are crushed by these vehicles on the beaches. The impact of thousands of people on the beach at one time is imperfectly known and could have irreversible long-term effects.
8. Special conditions: The publication "The California State Park System Plan-1968" states "The Department recognizes the Santa Maria Dunes-California's largest and most beautiful coastal dune-lagoon complex as the most urgently needed landscape preservation project in the State."

In the 1971 publication by the California Department of Parks and Recreation entitled "California Coastline Preservation and Recreation Plan," gave the Big Sur area first priority for preservation, Santa Maria Dunes (Nipomo Dunes) was third and Point Sal was sixth.

There is presently great interest and demand to keep this area open to recreational uses other than just passive pursuits like nature appreciation.

9. Studied by: Dr. Robert J. Rodin, Biological Sciences Department, California Polytechnic State University, San Luis Obispo, California.

April 1974



**Advisory
Council On
Historic
Preservation**

1522 K Street, NW
Washington, DC 20005

Reply to:

Lake Plaza South, Suite 616
44 Union Boulevard
Lakewood, CO 80228

June 13, 1980

United States Department of the Interior
Bureau of Land Management
Pacific Outer Continental Shelf
1340 West Sixth Street - Room 200
Los Angeles, California 90017

Dear Sir:

On May 9, 1980, the Council received your draft environmental statement (DES) for the Outer Continental Shelf Sale No. 53, Central and Northern California. Pursuant to Section 102(2)(C) of the National Environmental Policy Act of 1969 and the Council's regulations "Protection of Historic and Cultural Properties" (36 CFR Part 800), we have determined that your DES does not contain sufficient information concerning historic and cultural resources for review purposes. Please furnish the following data indicating compliance with Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. Sec. 470f, as amended, 90 Stat. 1320).

The environmental statement must demonstrate that either of the following conditions exists:

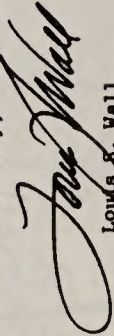
1. No properties included in or that may be eligible for inclusion in the National Register of Historic Places are located within the area of environmental impact, and the undertaking will not affect any such property. In making this determination, the Council requires:
 - a) Evidence that you have consulted the latest edition of the National Register (Federal Register, March 18, 1980, and its monthly supplements);
 - b) Evidence of an effort to ensure the identification of properties eligible for inclusion in the National Register, including evidence of contact with the State Historic Preservation Officer (SHPO), whose comments should be included in the final environmental statement. The SHPO for California is Dr. Knox Mellon.
2. Properties included in or that may be eligible for inclusion in the

Page 2
Bureau of Land Management
Outer Continental Shelf Sale #53
June 13, 1980

National Register of Historic Places are located within the area of environmental impact, and the undertaking will or will not affect any such property. In cases where there will be an effect, the final environmental impact statement should contain evidence of compliance with Section 106 of the National Historic Preservation Act through the Council's regulations, "Protection of Historic and Cultural Properties" (36 CFR Part 800).

Should you have any questions, please call Charles M. Niquette of my staff at 303/234-4946, an FTS number.

Sincerely,



Louis G. Wall
Chief, Western Division of
Project Review

ADVISORY COUNCIL ON HISTORIC PRESERVATION
1111 PLAZA SOUTH, SUITE 616
44 UNION BOULEVARD
LAKEWOOD, COLORADO 80228

**Advisory
Council On
Historic
Preservation**

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Historic Preservation

1522 K Street N.W.
Washington D.C.
20005

United States Department of the Interior
Bureau of Land Management
Pacific Outer Continental Shelf
1340 West Sixth Street - Room 200
Los Angeles, California 90017

PLEASE NOTE OUR CHANGE IN ADDRESS



DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
211 MAIN STREET
SAN FRANCISCO, CALIFORNIA 94105

SPWED-E

To: Manager, Pacific OCS Office
Bureau of Land Management
1340 W. 6th St., Room 200
Los Angeles, California
90017

8 July 1980

Subject: Proposed 1981 Outer Continental Shelf Oil and Gas Lease Sale
Offshore Central and Northern California Draft Environmental
Impact Statement (DEIS)

Following are our comments on the subject DEIS:

General Comments

1. The proposed activity is an administrative action and therefore will not require Department of the Army Authorization. However, any construction resulting from this action will require Department of the Army Authorization under Section 10 of the River and Harbor Act (including Section 4 of the Outer Continental Shelf Lands Act) and Section 404 of the Clean Water Act. For additional information please contact our Regulatory Function Branch at 415-556-5966.
2. Any impacts on wetlands, threatened or endangered species, other valuable fish and wildlife resources, and on cultural resources, are among the important environmental considerations for all Corps permit applications.
3. From the data provided, it can not be ascertained whether or not the Corps' interim designated dredged disposal site located offshore of Humboldt Bay (coordinates 40° 45' 44" N, 124° 15' 42" W - with a 500 yard radius) would be affected by the proposed activity. Maps with sufficient detail to make a determination on the proposed project's impact should be provided. For additional information please contact our Natural Resources Section at 415-556-5413.
4. It has been our experience that residents along the California coast are aware and concerned about oil development. Given the magnitude and diversity of impacts associated with the lease sale proposal, it appears that a discussion of the public's perception of the lease sale as related to community cohesion would be beneficial to the decision maker.

Specific Comments

page 1-20 2nd paragraph: It is stated that oil will be transported by gathering lines to an "offshore storage and treating facility". Given the historical public opposition of the Monterey Bay area residents to any project resembling a "refinery" it is suggested that the "offshore storage and treating facility" be fully explained.

SPWED-E

To: Manager, Pacific OCS Office
Bureau of Land Management
1340 W. 6th St., Room 200
Los Angeles, CA 90017

Subject: Proposed 1981 Outer Continental Shelf Oil and Gas Lease Sale
Offshore Central and Northern California Draft Environmental
Impact Statement (DEIR)

page 1-42 U.S. Army Corps of Engineers:

last paragraph last sentence - Change "Section 10 of the Rivers and Harbor Act of 1899 (30 stat. 1151) requires that permits be issued for all offshore constructions, including pipelines, in the U.S. navigable waters." to "Section 10 of the Rivers and Harbors Act of 1899(33 USC 403) requires that permits be issued for all works eg. construction of platforms, pipelines etc. in Navigable waters of the U.S. (43 USC 1333(f))."

2nd paragraph: Suggest paragraph read as follows " Permits are also required under Section 404 of the Clean Water Act if the work involves the discharge of dredged or fill material in Waters of the U.S. including adjacent wetlands (33 USC 1344). Certain survey activities including core sampling might be permitted by nationwide permit (33 CFR 322.4(f))."

page 1-70 paragraph b: It is stated..."no crude oil will be transported by surface vessel from offshore production sites...". This statement appears to conflict with the last paragraph on page 1-19 and first paragraph on page 1-20 where it states oil will be transported by tankers from the Point Arena area to refineries in the San Francisco Bay area and oil will be transported by barges from the Bodega area to refineries in the San Francisco Bay area.

page 2-29/30 2nd paragraph: The deletion of Eel River, Point Arena, and Bodega subarea tract groups from consideration as viable options due to the minimal coastal and marine resources as compared with OCS development appears to conflict with the statement on page 2-5 which reads:"Impacts (referring to marine and coastal ecosystems) caused by long-term chronic oil pollution remain uncertain."

page 3-148b 2nd paragraph: The future without the project condition would result in one oil spill while the "with" project condition would add one more oil spill according to the oil spill model. The "with" project condition results in a 100 percent increase in oil spill incidents over the "without" project condition and is considered significant. Also significant and yet not mentioned is the expected size of the oil spills both "with" and "without" the project. What is insignificant is the estimated time frame (i.e. 30 years) in which the oil spill incident is projected to occur.

SPWED-E

To: Manager, Pacific OCS Office
Bureau of Land Management
1340 W. 6th St., Room 200
Los Angeles, CA 90017

Subject: Proposed 1981 Outer Continental Shelf Oil and Gas Lease Sale
Offshore Central and Northern California Draft Environmental
Impact Statement (DEIR)

page 4-19 Scenario 2: Footnote b should read "...1000 BBL's/year..." and not
"...100 BBL's/year..."

page 4-19 Scenario 3: Does this table include expected number of oil spills
in the Gulf of Mexico or just spills expected to occur in the Pacific Ocean?

page 8-1 paragraph VIII A.1.a.i.: Add the following sentence "Also, the
Corps of Engineers has responsibility for the discharge of dredged or fill
material in Waters of the U.S. under Section 404 of the Clean Water Act
(33 USC 1344)."

Thank you for including us in your review process.

MM Childs

Rod Chisholm
Chief, Management & Services Section
Environmental Branch
(415-556-5412)

CF:

Director (540)
Bureau of Land Management
Washington, D.C. 20240



United States Department of the Interior

NATIONAL PARK SERVICE
WASHINGTON, D.C. 20240

IN REPLY REFER TO:
L54(135)
DIB 80/24

Memorandum

To: Director, Bureau of Land Management

Through: Assistant Secretary for Fish and Wildlife and Parks

From: Director, National Park Service

Subject: Draft Environmental Statement for Proposed 1981 Outer Continental Shelf Oil and Gas Lease Sale No. 53

We have reviewed the subject document and have the following comments:

General Comments

We have been involved in the development of the project early on and past memorandums have reflected our continuing concerns. We understand as this is a programmatic environmental impact statement the discussions of the environment, especially the impacts, at times must be dealt with in generalities. This makes the subject project difficult to evaluate and we believe further analysis of the local environmental consequences is needed before final decision can be made. The proposed United States Geological Survey reports are staged too late in the planning process to be a useful tool. We recognize the national need to develop energy sources but remain concerned about the potential consequences of such activities. Proposed OCS Sale #53 affects Redwood National Park, Point Reyes National Seashore, Golden Gate National Recreation Area, and Channel Islands National Park. The probability of spills, well blowouts, expected "ambient" leakage, increased tanker traffic, and the visual intrusion of the oil rigs on the presently uncluttered horizon are potential serious effects of the proposed action. Oil operations are threats to the parks because of these potential hazards. Therefore, we would like to recommend for deletion from the sale the tracts in close proximity to the parks above or through which currents can pass and carry pollutants that may damage the park environments.

The Cumulative Impact sections in general are inadequate as only the effects of the action in relationship to the present Southern California oil lease (OCS Sales #35 and #48) are discussed. Cumulative impacts should reflect the possible results of all Federal or non-Federal actions, though perhaps initiated for unrelated purposes. To imply that an oil spill in northern California

Noted
1/15/81
WBS

tracts would not affect Southern California is inaccurate (Page 4-11, paragraph 1). For example, fishing pressures could increase in Southern California if northern habitats are polluted. Likewise, the statement, "The only areas where a significant increase in cumulative impacts from spilled oil would occur is San Miguel Island," (Page 3-183), is misleading. Spilled oil could impact the other park islands as well.

Specific Comments

Visual No. 9, Recreation. Golden Gate National Recreation Area with 48,000 square acres of coastal headlands and bay front lands should be included on the map. Also, the islands of San Miguel and Santa Rosa are part of the newly established Channel Islands National Park and should be color coded accordingly.

Table IV.A. 1-2, Shoreline Segment Numbers 40, 41, 42 and 43 are all part of Channel Islands National Park. This information should be included when discussing "Significant Areas".

We appreciate the opportunity to review this document and look forward to reviewing the final environmental impact statement. However, we would like to be provided with ten copies of the document to share with the individual parks affected by the plan.



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

Commander (dpl)
12th Coast Guard District
630 Sansome Street
San Francisco, CA 94126
Phone: (415) 556-6074

16477

18 JUN 1980

From: Commander, Twelfth Coast Guard District
To: Commandant (G-WS-1/12)

Subj: Draft Environmental Impact Statement: Proposed 1981 Outer
Continental Shelf Oil and Gas Lease Sale No. 53, Offshore
Central and Northern California

Ref: (a) Your ltr 16477.4b675 of 1 May 1980

1. Attached are combined comments of the 11th and 12th Districts
relative to subject DEIS.

J. S. GRACEY

Encl: (1) Consolidated 11th and 12th District Comments

CONSOLIDATED 11TH AND 12TH DISTRICT COMMENTS

1. The DEIS in its examination of economic impacts states that costs for the exploration and development of proposed tracts in traffic lanes could increase as a result of restrictions placed on exploration and development. It is completely silent, however, on the economic impact of added vessel transit time and steaming miles if traffic is routed around the areas of high oil and gas interest. This impact is significant and should be considered.
2. References to pipeline burial throughout the DEIS are inconsistent. Certain portions infer that pipelines are required to be buried while others leave the topic of burial up in the air. Until USGS's OCS Order No. 9 is developed, BLM should adopt a firm position on the subject.
3. The use of dispersants is an area which deserves more emphasis. Due to the difficulty of containing and cleaning up an oil spill in the open sea by conventional means, the use of new generation low toxic dispersants may be a valuable tool in mitigating the effects of such a spill but only if used promptly. Little meaningful study in this area has been done however. It is recommended that such a study be sponsored by BLM and added to the OCS Environmental Studies Plan.
4. There are numerous references to the "proposed Traffic Separation Scheme (TSS) between Point Conception and the California/Oregon border". Discussion on page 3-111 refers to an ongoing Port Access Route (PAR) Study, however other textual references do not indicate the relationship of these two items. It should be stressed that the TSS between Point Conception and the California/Oregon border is just one of several alternatives being considered by the PAR study. As such, reference to the TSS should be described so as not to give the impression that it is the final proposal emerging from this study.
5. Mitigating measures discussed in the 3rd paragraph on page 4-165 are within the purview of BLM under Title I and II of the OCS Land Act Amendments of 1978. Also none of the proposed mitigation stipulations in the DEIS address navigational safety.
6. The reference to DCF Regulations on page 4-57 of the DEIS should read: Table 49 Code of Federal Regulations Part 195.246.
7. The reference on page 5-7 should read "Jenkins, G. Lt. 1979, U. S. Coast Guard, District 12." if lieu of "Jenkins, G. Lt. 1979, U. S. Coast Guard, District 11." This also affects a textual reference on page 3-112, line 7.
8. Minor typographical errors were also noted on:
page 1-37, line 6 "Production"
page 1-38, line 19 "asd"
page 1-44, line 3 "responsibility"
page 1-73, line 8 "lan"
page 4-146, line 22 "reaching"
page 4-166, line 6 "lands"



CITY HALL
PACIFIC GROVE, CALIFORNIA 93950

Consent Agenda Item No. 5

7-9-80

CITY OF PACIFIC GROVE

RESOLUTION NO. 5352

RESOLUTION OPPOSING OUTER CONTINENTAL SHELF LEASE NO. 53.

THE CITY OF THE CITY OF PACIFIC GROVE DOES RESOLVE AS FOLLOWS:

1. The Santa Cruz Basin be deleted from the Department of Interior's Lease Sale No. 53, and any leasing of the Santa Maria Basin be delayed for at least two years and until sufficient environmental studies in respect thereof shall have been completed.
2. That in any event, sufficient tracts be deleted from Lease Sale No. 53 to assure protection of the habitats of the sea otter.
3. A certified copy hereof be transmitted to the Bureau of Land Management of the Department of Interior forthwith.

PASSED AND ADOPTED BY THE COUNCIL OF THE CITY OF PACIFIC GROVE this 2nd day of July, 1980, by the following vote:

AYES: Councilmembers Hughes, Fisher, Franco, Martine, Sloan, Long,
and Mayor Williams.

NOES: None

ABSENT: None

APPROVED: July 2, 1980

/s/ Florus C. Williams
Mayor

ATTEST:

/s/ William S. Pitt
City Clerk

CLERK'S CERTIFICATION

I, WILLIAM S. PITT, City Clerk of the City of Pacific Grove, California, do hereby certify that the foregoing is a full, true and correct copy of Resolution No. 5352 passed and adopted by the Council of the City of Pacific Grove on the 2nd day of July, 1980.

William S. Pitt
WILLIAM S. PITT
City Clerk of the
City of Pacific Grove

CHAPTER VIII

VIII. APPENDICES

A.1. Approvals, Certifications, and Permits: Federal, State, and local authorizations that must be obtained to implement the proposed action are given below.

a. Federal Agencies

i. Department of the Army (Section 10 of the River and Harbor Act of 1899): The Corps of Engineers issues construction permits to conduct exploratory drilling of oil and gas wells and to construct platforms, production facilities, and pipelines. The Corps of Engineers has the responsibility to consider all matters affecting navigation and national security.

ii. Department of the Interior, Bureau of Land Management (43 CFR 3300): The Bureau of Land Management grants rights-of-way on the Outer Continental Shelf (OCS) for pipelines other than gathering pipelines.

iii. Department of the Interior, Geological Survey: The Geological Survey (GS) approves 1) Exploratory Plan and accompanying Environmental Report, 2) Development and Production Plan and accompanying Environmental Report, 3) application of permit to drill, deepen, or plug back wells, and 4) right of use and easement on the OCS to construct and maintain platforms, artificial islands, gathering pipelines and other devices which are permanently or temporarily attached to the seabed (30 CFR 250).

GS issues permits for construction and operation of all oil and gas equipment on the OCS that could emit air pollutants. They also determine exemptions for certain equipment and facilities, and enforce limitations on existing, new, or modified sources (Clean Air Act Amendments of 1977 and OCS Lands Act Amendments of 1978).

iv. Department of Transportation (33 CFR 62.01): The Coast Guard approves applications for Private Aid to Navigation. The Coast Guard promulgates and enforces regulations on lights and other warning devices, safety equipment and other matters relating to safety of life and property. For other Coast Guard responsibilities see Section I.B.3.b.

v. Environmental Protection Agency (40 CFR 125): The Environmental Protection Agency (EPA) issues the National Pollution Discharge Elimination System Permits for oil and gas operations prior to well drilling. EPA is responsible for the discharge of pollutants from point sources, into navigable water, the contiguous zone, and the ocean.

vi. Federal Communications Commission (Federal Communication Act of 1934, U.S. Title Code 47): The Federal Communication Commission issues the license for radio communication equipment.

vii. Federal Power Commission (Natural Gas Act): The Federal Energy Regulatory Commission issues the certificate of public convenience and necessity for the construction and operation of natural gas facilities.

b. State of California

i. California Coastal Commission issues a certification of Consistency with the approved State of California Coastal Zone Management program (Section 306 of the Coastal Zone Management Act of 1972 [16 U.S.C. 1455]).

California Coastal Commission also issues permits for pipeline construction from the 3-mile limit offshore to coastal zone jurisdiction inland (California Coastal Zone Conservation Act of 1972 [Proposition 20]).

ii. California Public Utilities Commission issues encroachment permits for pipeline crossings of railroads and utility rights-of-way.

iii. Division of Industrial Safety issues permits for trenches concerning onshore pipeline construction.

iv. Department of Parks and Recreation issues encroachment permits for pipeline construction across State-owned beaches.

v. Department of Transportation Division of Highways issues permits for road turnout construction on highways and pipeline crossings of highways.

vi. Solid Waste Management Board issues permits for disposal of solid and hazardous waste material.

vii. State Land Commission issues rights-of-way leases across State Lands for construction of pipelines (Division 6 of the Public Resources Code and Title 2, Division 3, of the California Administrative Code).

viii. State Water Resources Control Board issues permits for wastewater discharge and surface drainage.

c. Local Governments

i. Air Pollution Control District issues permits to construct and operate oil and gas treatment facilities within the county jurisdiction and out to the 3-mile limit.

ii. County Department of Transportation issues permits for road excavation and encroachment permits for pipeline construction.

iii. Approvals from other County Departments

iv. Approvals, certifications, and permits for the City authorities.

GLOSSARY

- Anadromous - migrating up rivers from the sea to breed in fresh water.
- Benthic - Bottom dwelling.
- Benthic macroinvertebrate - Animals such as worms, clams, or crabs which are large enough to see without the aid of a microscope.
- Demersal - Bottom dwelling.
- Epibenthic organism - Those organisms attached to, or living on a substrate as opposed to those which burrow and live in the substrate.
- Microcrustacean - Any relatively small crustacean (may range from microscopic to a few inches in size) including organisms such as shrimp, crabs, beach hoppers (amphipods) copepods and other similar groups.
- Mysids - Small shrimp like organisms.
- Ovoviviparous - Producing eggs that hatch within the female's body.
- Subtidal - Generally considered to be that part of the ocean bottom not uncovered by tidal action.

ABBREVIATIONS

ANS	Alaska North Slope
API	American Petroleum Institute
ASBS	Areas of Special Biological Significance
BLM	Bureau of Land Management
BP	before present
CARB	California Air Resources Board
CEIP	Coastal Energy Impact Program
CEP	Council of Environmental Protection
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CZMA	Coastal Zone Management Act
DEIS	Draft Environmental Impact Statement
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ERG	Environmental Resources Group
FACSFAC	Fleet Area Control and Surveillance Facility
FWPCA	Federal Water Pollution Control Act
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulation Commission
FWPCA	Federal Water Pollution Control Act
FWS	U.S. Fish and Wildlife Service
GS (also:USGS)	U.S. Geological Survey
IMCO	Intergovernmental Maritime Consultative Organization
IPP	Intergovernmental Planning Program
LCP	Local Coastal Plan
LNG	Liquified Natural Gas
LUP	Land Use Plan
MIT	Massachusetts Institute of Technology
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NGPA	National Gas Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant and Discharge Elimination System
OCS	Outer Continental Shelf
OS&T	Offshore Storage and Treatment
PA	Precautionary Area
PAR	Port Access Route
PMTC	Pacific Missile Test Center
PSD	Prevention of Significant Deterioration
SID	Secretarial Issue Document
SMB	Single Mooring Buoy
SSF	Shipping Safety Fairway
TSS	Traffic Separation Scheme
USCG	U.S. Geological Survey
USGS (also:GS)	U.S. Geological Survey
WSMC	Western Space and Missile Center

UNITS OF MEASURE

B/D (also bcd)	=	barrels per calendar day
BBL	=	barrels
cm	=	centimeter
dBA	=	decibels audible
dwt	=	dead weight ton
hr	=	hour
km	=	kilometer
l	=	liter
m	=	meter
maxi.	=	maximum
mg	=	milligrams
mgd	=	million gallons per day
ng	=	nannogram
nm	=	nautical mile
PPB	=	parts per billion
pphm	=	parts per hundred million
PPM	=	parts per million
PPT	=	parts per thousand
sp.	=	species
ug	=	microgram
0/00	=	parts per thousand

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